

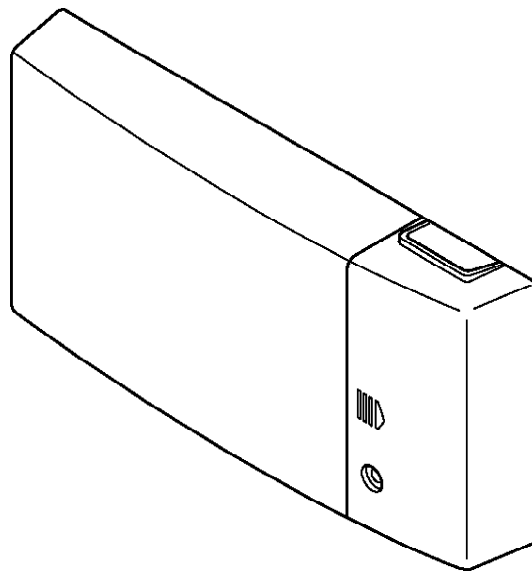
ORDER NO. KMS0008516C3

Service Manual

1 E1 LINE EXPANSION UNIT

KX-TD188X

(for Asia, Middle Near East and Africa)



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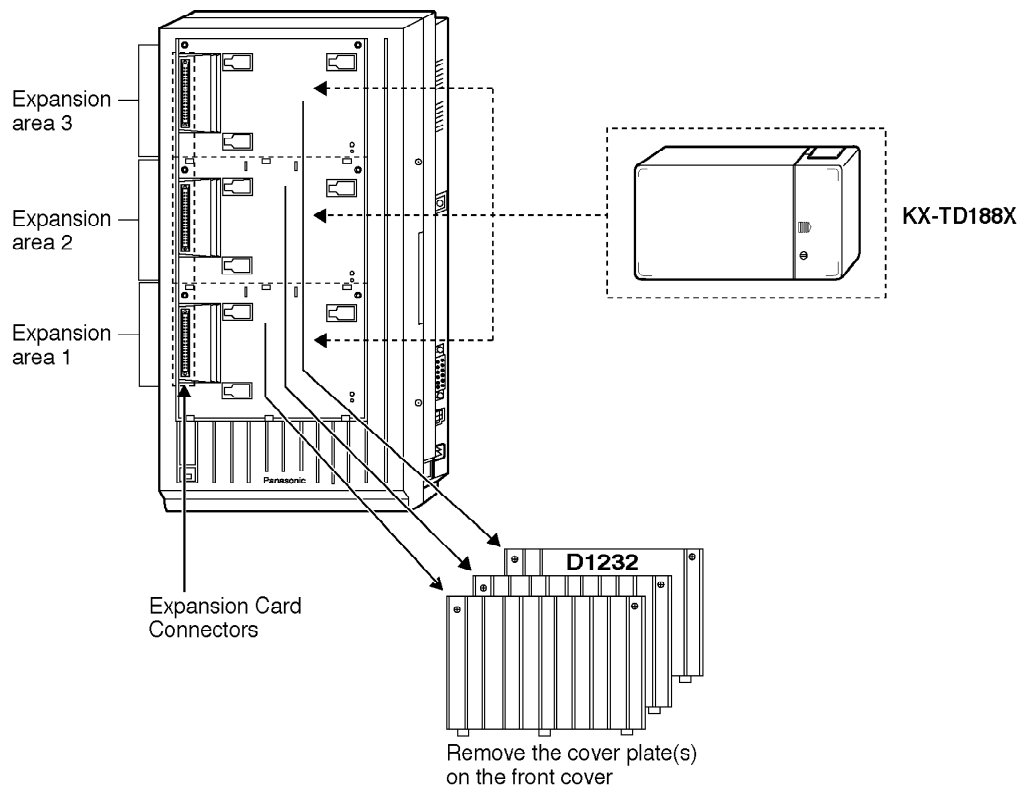
⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

1. LOCATION OF THE UNIT

The location of the optional unit shown below. / One E1 Line Expansion unit can be installed to any expansion area on the main unit, KX-TD1232 only.



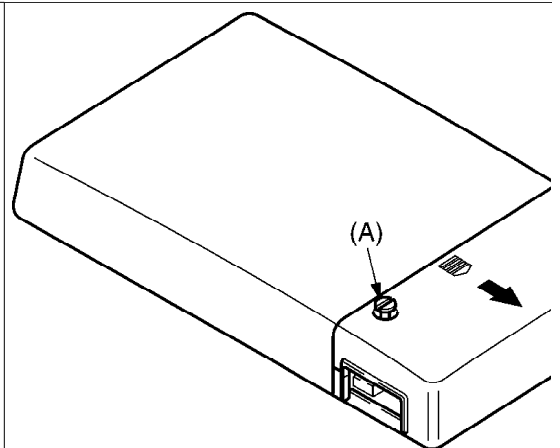
Notes:

System Programming is required for card location identification. For details, refer to the Installation Manual.

2. DISASSEMBLY INSTRUCTIONS

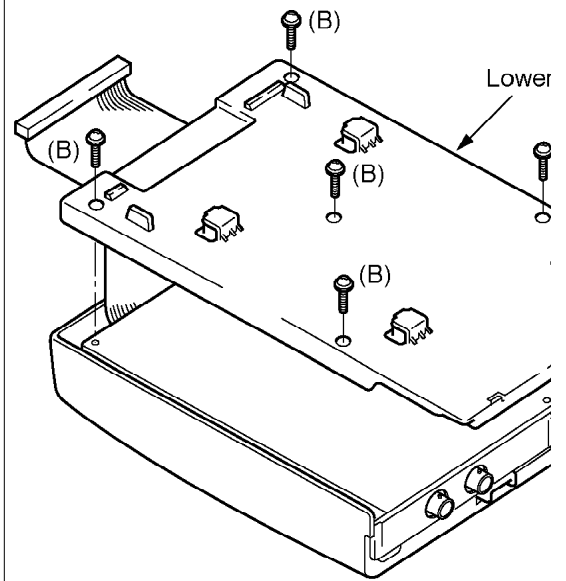
2.1. HOW TO REMOVE THE COVER / (Procedure 2.1.)

(1) Loosen the screw (A). / (2) Slide the cover in the direction of the arrow.



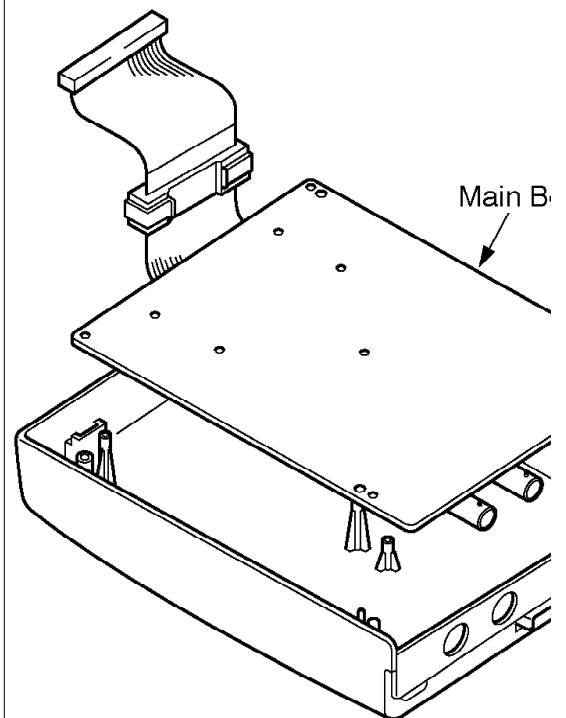
2.2. HOW TO REMOVE THE LOWER CABINET / (Procedure 2.1. → 2.2.)

(1) Remove the 5 screws (B). / (2) Remove the lower cabinet.



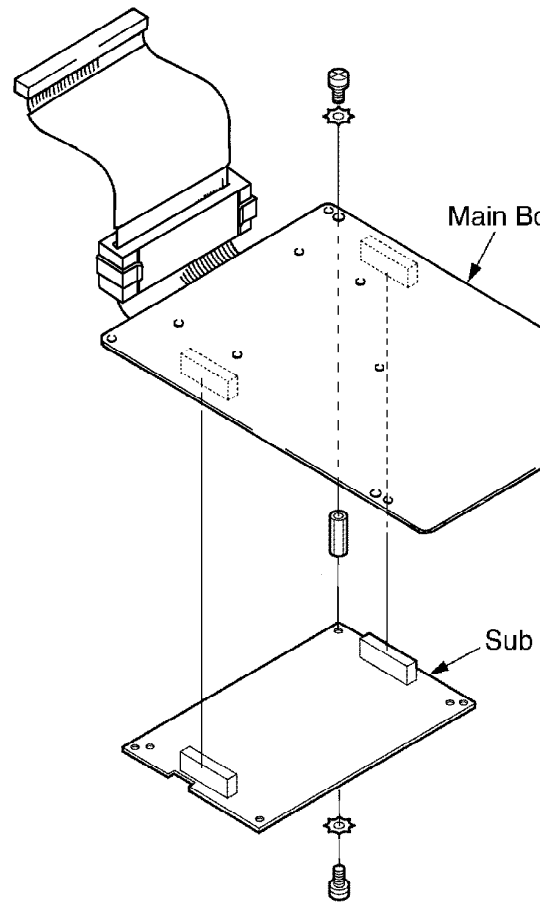
2.3. HOW TO REMOVE THE MAIN BOARD / (Procedure 2.1. → 2.2. → 2.3.)

(1) Remove the main board.

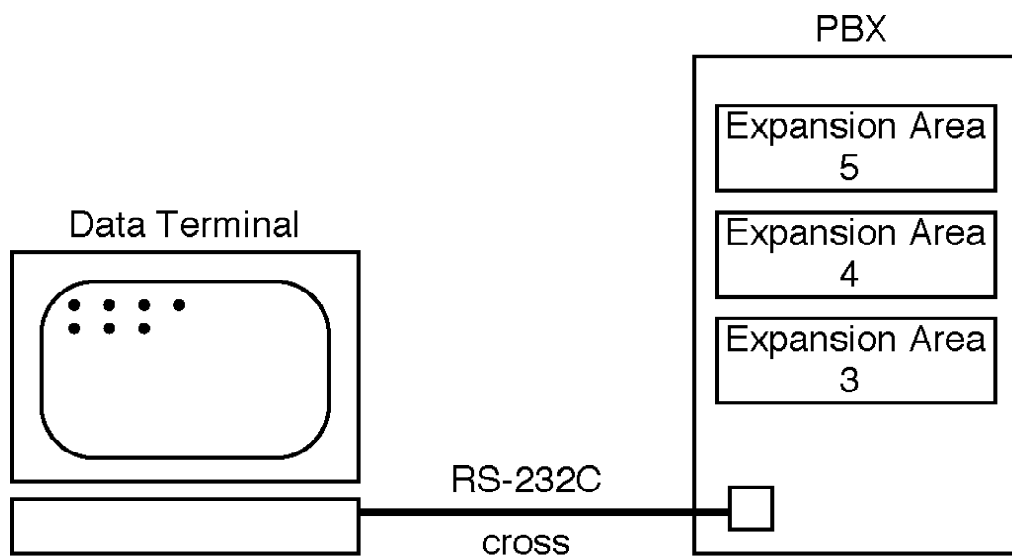


2.4. HOW TO REMOVE THE SUB BOARD / (Procedure 2.1. → 2.2. → 2.3. → 2.4.)

(1) Remove the sub board.



3. DIAGNOSTIC METHOD



3.1. HOW TO GET INTO SELF-DIAGNOSTIC MODE

1. Set the main power switch to ON. (PBX and Data Terminal)

2. Connect the Data Terminal to the RS-232C of PBX and press the return key of the Data Terminal in 10 seconds.

3. After message is displayed, enter password.

Ex.)

```
Welcome to KX-TD1232 Ver. 2.0
Panasonic CO.,LTD / Enter Password /
?????? ↓
```

4. After response message is received, enter diagnostic mode shift command "DAG".

Ex.)

```
EIA Mode Start / DAG ↓
```

5. After response message is received, diagnostic command can be used.

Ex.)

```
DIAG Mode Start
```

*Setting of RS-232C communication parameter

Return Cord:	CL+LF
Borate:	9600bps
Data:	8 bit
Parity Bit:	None
Stop Bit:	1 bit

3.2. HOW TO PERFORM SELF-DIAGNOSTIC MODE

1. After entering self-diagnostic mode, enter Card Information command "XS P1" (P1=Expansion Area number) and check response "OK 1, 0, 41, 00, 00, xxxx, xxxx, xxxxxxxxxxxxxxxx". / x= don't care
2. Enter Loop back command "XU P1, 00" (P1=Expansion Area number) and check response "OK 00".
3. Enter DSP/DSP command "XX P1" and check response "OK 00, 00".

4. Enter PBG/DSP command “XY P1” and check response “OK 00, 00, 0”. / If not, please refer to **TROUBLE SHOOTING GUIDE**.

4. CIRCUIT OPERATION

4.1. FUNCTION

(1) E-1 interface	Converts E-1 bipolar signals to PCM format signals, and PCM format signals to E-1 bipolar signals.
(2) DTMF transmission	Sends DTMF signals to the E-1 line.
(3) DTMF detection	Detects DTMF signals from the E-1 line.
(4) Gain control	Distributes the gain due to the E-1 line.
(5) Synchronization	Generates the system clock from the E-1 line, and the send clock to the control

4.2. MAIN CPU INTERFACE CIRCUIT

(1) Composition

The MAIN CPU interface circuit is composed of comparators (IC41), buffers (IC21, IC32, IC33), FIFO (IC1) and decoder (IC21).

(2) Circuit Operation

The control data is written in FIFO by the MAIN CPU control signal and read by this card's CPU (IC3). When FIFO is empty, the Card's CPU (IC3) writes the data to send to the MAIN CPU card. / FIFO is 64 bytes size. When this card installs in the free slot, and turn on power switch, this card keeps reset status until cancelling reset status by MAIN CPU. / LED of this card (LED5) for reset status.

4.3. CONTROL CIRCUIT

(1) Composition

The control circuits is composed of a CPU (IC3), gate array (IC2), flash memory (IC6, IC17), and SRAM (IC18, IC19).

(2) Circuit Operation

When the MAIN CPU reset status is cancelled, the Card's CPU executes an initial operation which sets the parallel I/O, internal timers, etc. / After the initial operation, the Card's CPU controls the line circuits following the program.

4.4. E-1 LINE CIRCUIT

(1) Composition

This circuit is composed of the E-1 Framer (IC4).

(2) Circuit Operation

The E-1 framer has the following functions. / D4 (SF) and ESF framing. / Insertion and detection A, B, C, D bits. / Zero code suppression. / Loss of signal indication. / Yellow and blue alarm signal capabilities. / The E-1 framer converts E-1 bipolar signals to PCM format signals, and PCM format signals to E-1 bipolar signals. / Included PLL circuit.

4.5. TSW CIRCUIT

(1) Composition

This circuit is composed of the Main TSW (IC5) and Sub TSW(IC6).

(2) Circuit Operation

The TSW circuit has the following functions. / 32 channel dual tone generator, including 16 standard DTMF tones and tone ringer. / Programmable per channel gain control from +3 to -27dB, increments of 1dB for output channels. / Supports both A-law and u-law operation. PCMHW data from Main TSW are switched to three highways of the main CPU board. And PCMHW data from TSW on the main CPU board are switched to Main TSW.

4.6. DSP CIRCUIT

(1) Composition

This circuit is composed of DSP (IC301), Signal level converter (IC302, IC303, IC304), Frame sync generation (IC307, IC308, IC309, IC310) and Dual Voltage generator (IC306).

(2) Circuit Operation

- **DSP codes and decodes DTMF and MFC-R2 signals.**
- **Signal level converter changes signal level from 5V to 3.3V or from 3.3V to 5V.**
- **Frame sync generation makes DSP's frame sync pulse from system's frame sync pulse.**
- **Dual Voltage generation generates source voltage (+1.8V and +3.3V) from +5V.**

4.7. CPLD CIRCUIT

(1) Composition

This circuit is composed of the CPLD (IC7) and buffer (IC36, IC37).

(2) Circuit Operation

The TSW has the following functions. / PCM H/W control. / MCLK control. / DTMF receiver time slot control.

4.8. DC-DC CONVERTER CIRCUIT

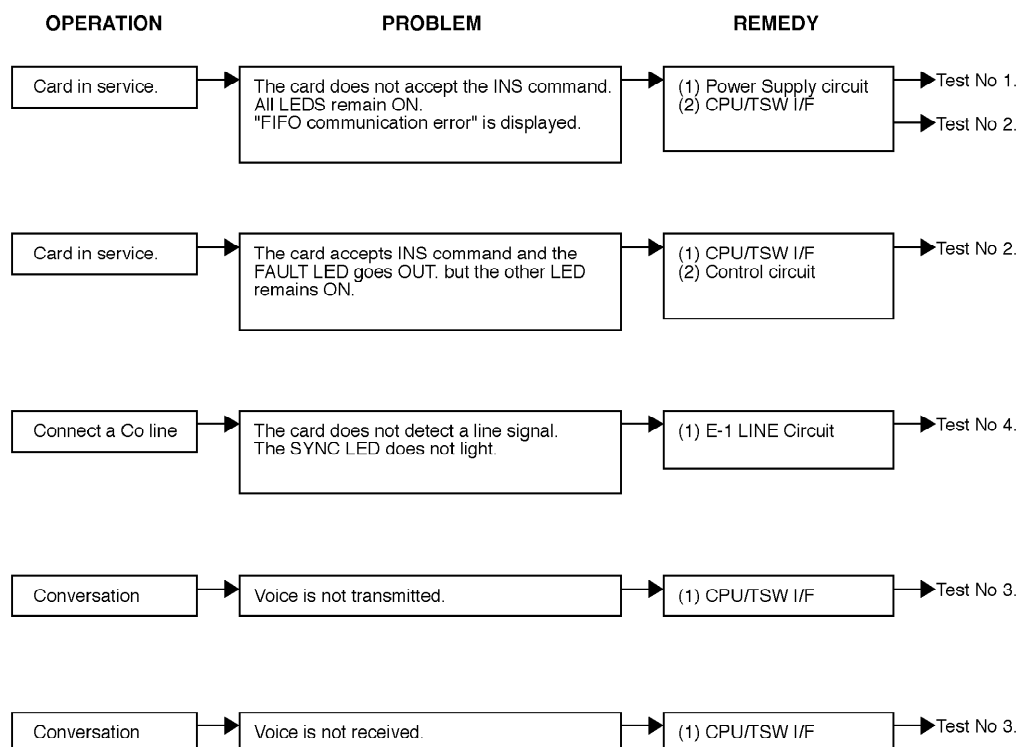
(1) Composition

This circuit is composed of the DC-DC converter (IC43), transistor (Q3), coil (L52) and diode (D3).

(2) Circuit Operation

This circuit steps down from DC+15V to DC+5V.

5. TROUBLE SHOOTING GUIDE



*Description of LED

LED1 Sync Indication (Light ON = Sync)

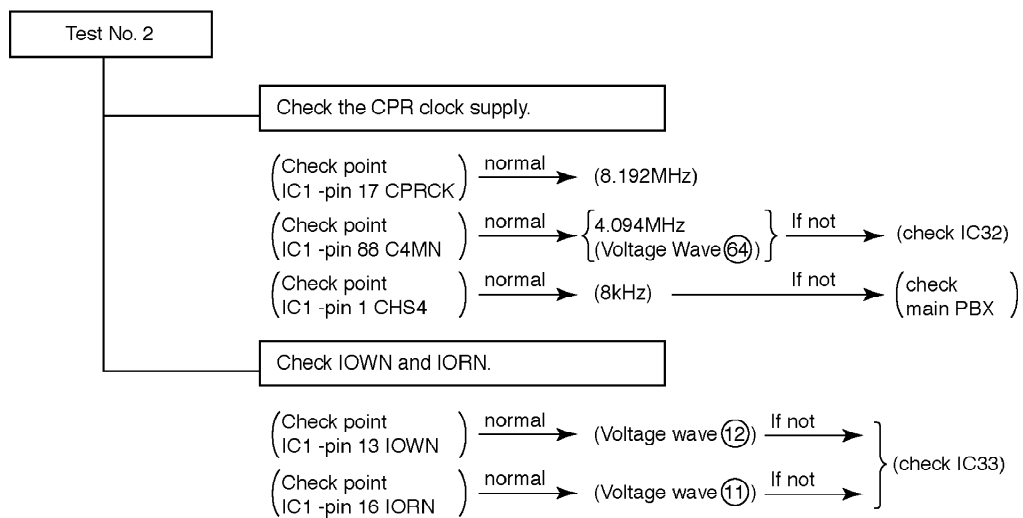
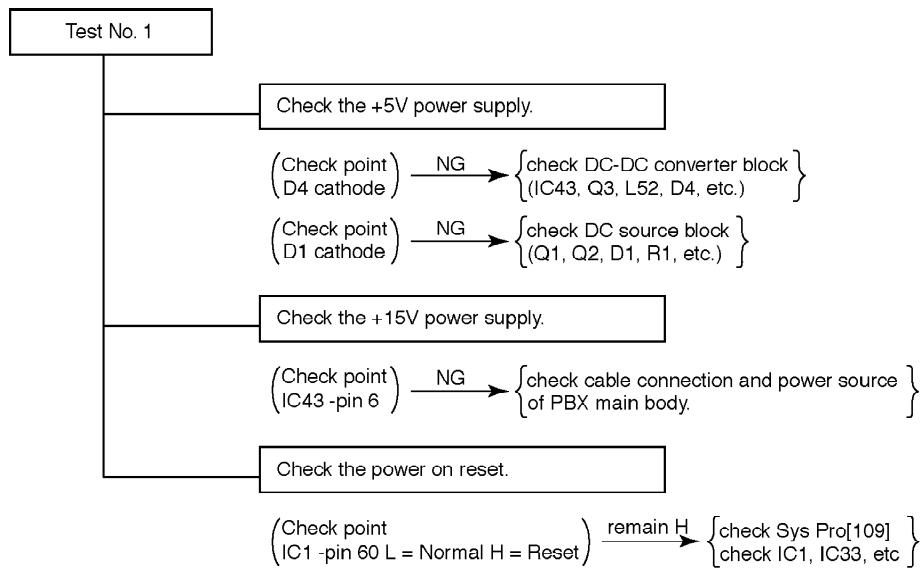
LED2 AIS Indication (Light ON = AIS detect)

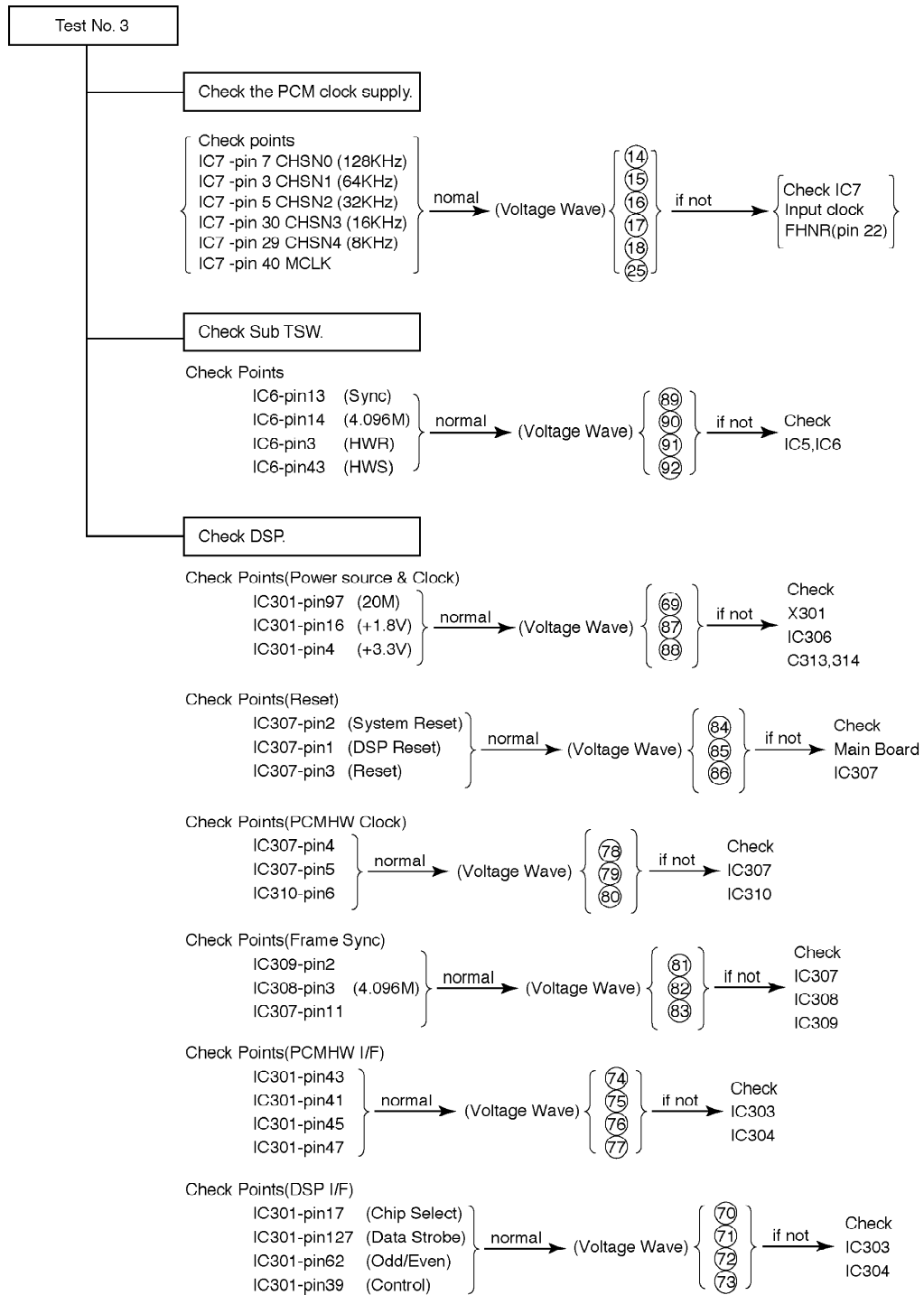
LED3 RAI Indication (Light ON = RAI detect)

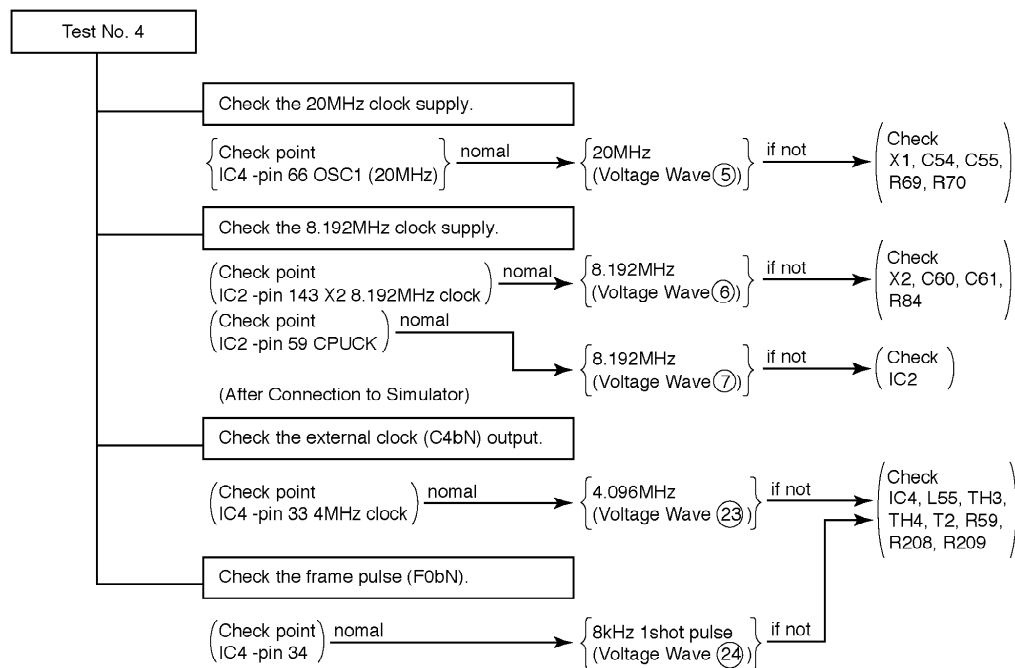
LED4 OUS Indication (Light ON = Out of Sync)

ALL LED's Light ON = Hardware Reset Activated

ALL LED's Light OFF = Ready (Not synchronized after reset deactivated)







6. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, If you have solder (large amount) a soldering iron and a cutter knife, you can easily remove IC's even though large than 100 pins.

6.1. PREPARATION

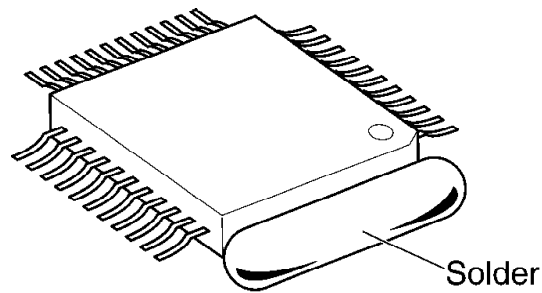
- SOLDER / Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-19RMA
- Soldering iron / Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$) / (An expert may handle a 60~80 W iron, but beginner might damage foil by overheating.)
- Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)

6.2. FLAT PACKAGE IC REMOVE PROCEDURE

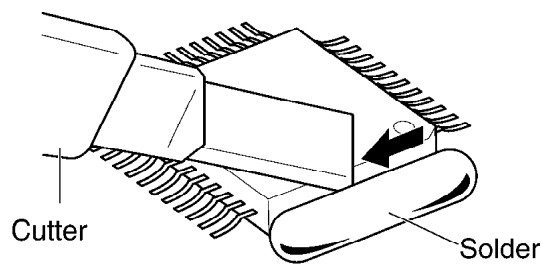
1. When all of the IC lead can not be seen at the standard degree, fill with large quantities of solder.

Note:

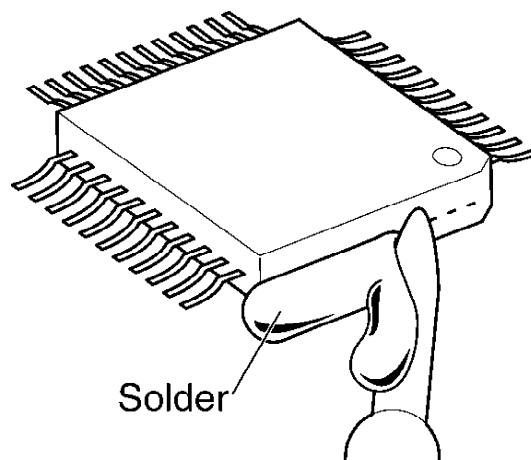
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C.board's pattern. If you do not fill with large quantities of solder as in step 1 the P.C.board pattern may have to be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with the cutter lightly 5 or 6 times.)



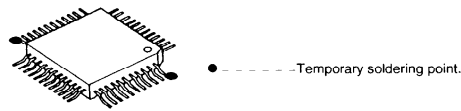
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching the new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

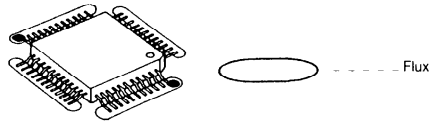
6.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporary fix FLAT PACKAGE IC by soldering on two marked pins.

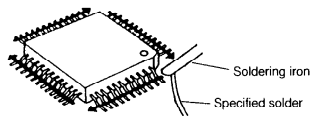


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.

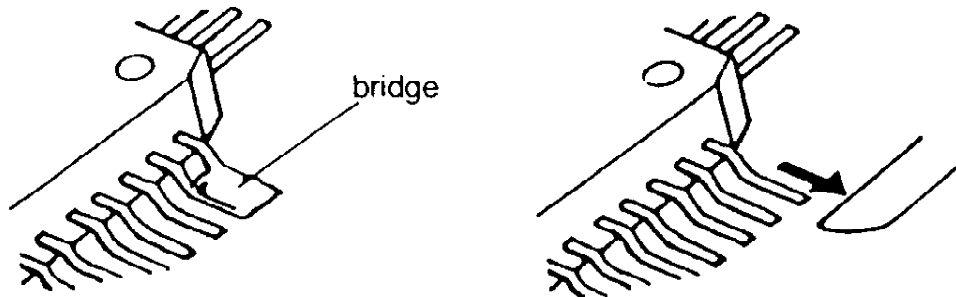


3. Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.

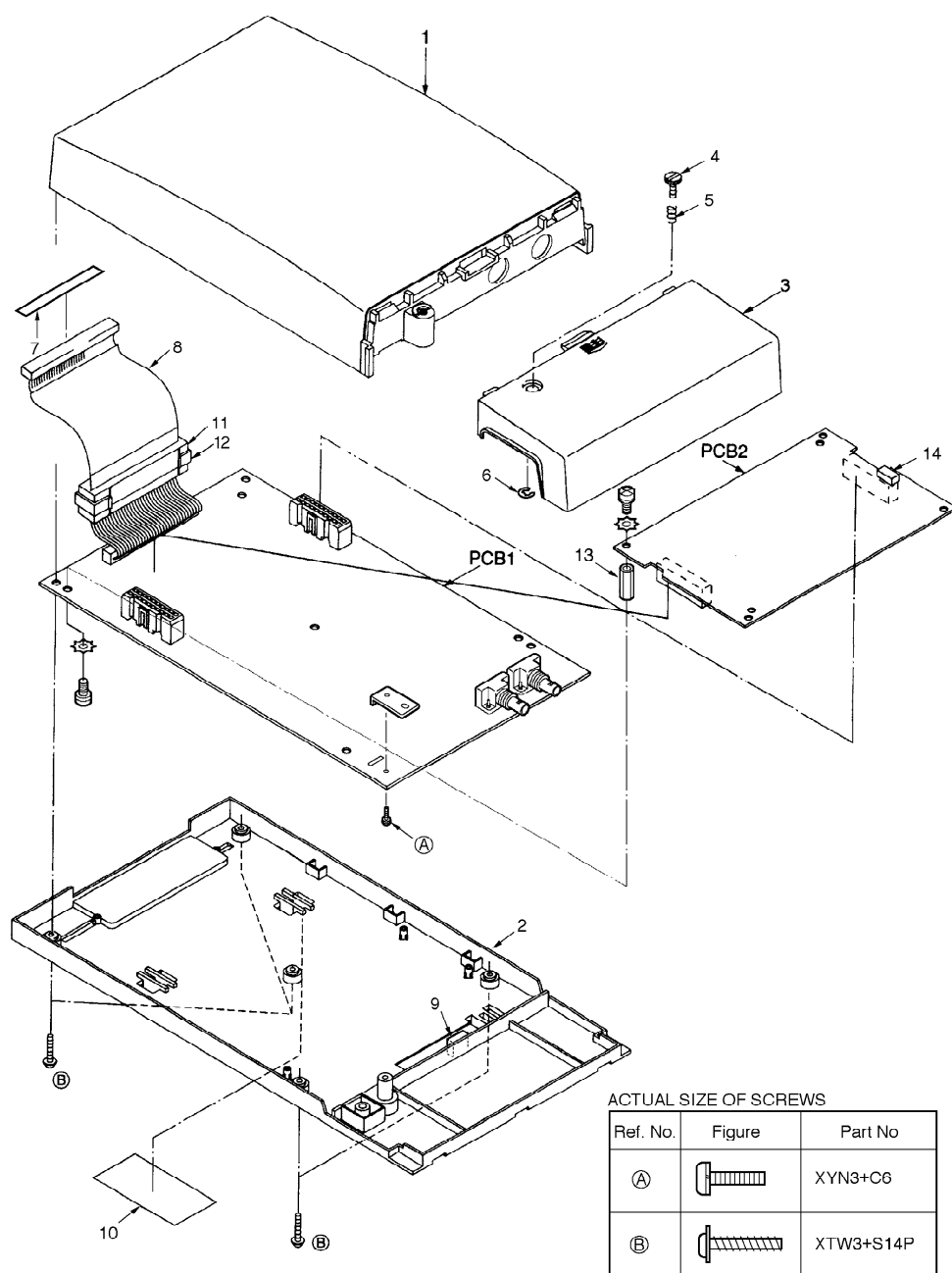


6.4. BRIDGE MODIFICATION PROCEDURE

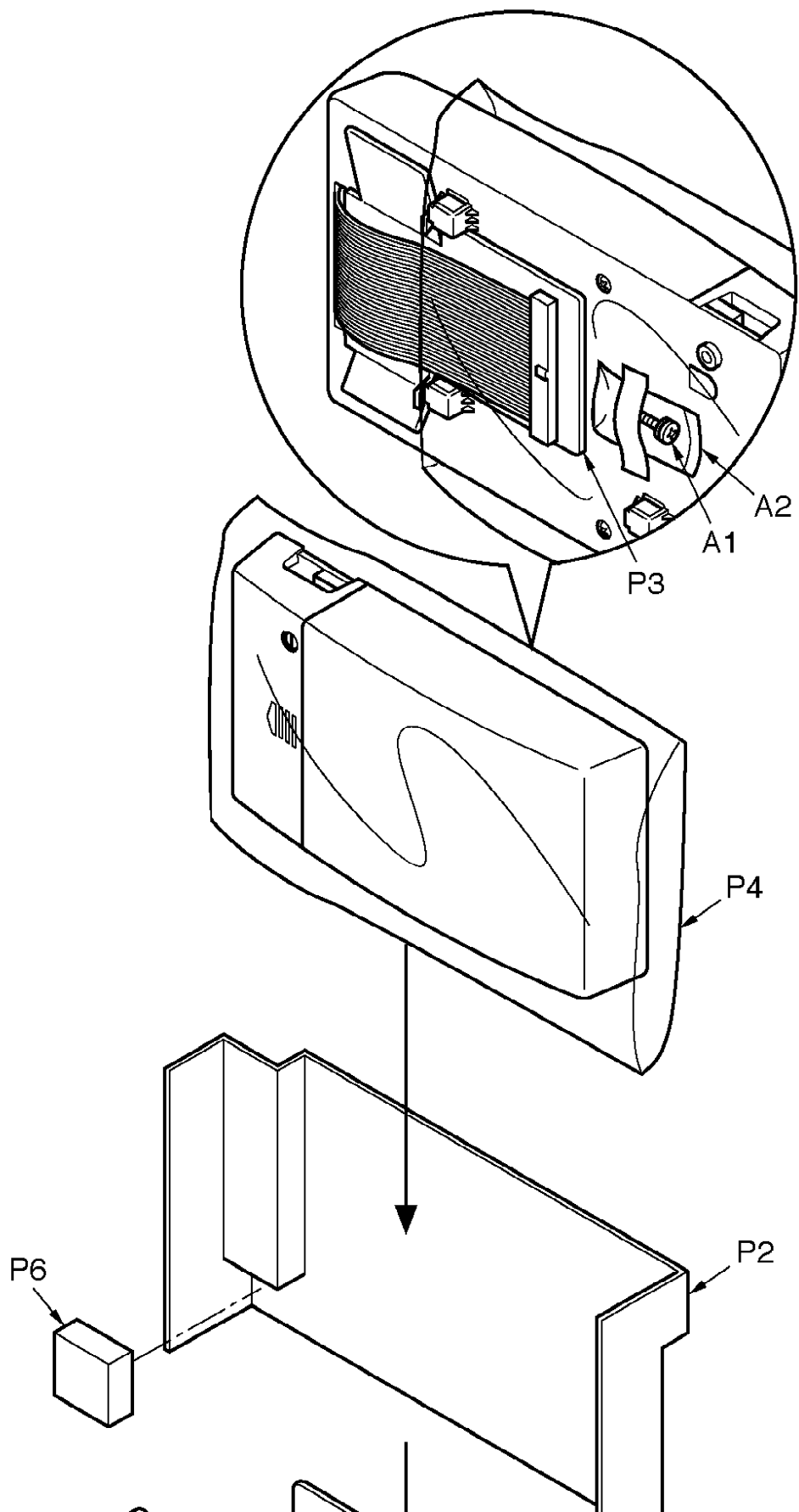
1. Lightly re-solder the bridged portion.
2. Remove the remaining solder along pins using a soldering iron as shown in the figure below.

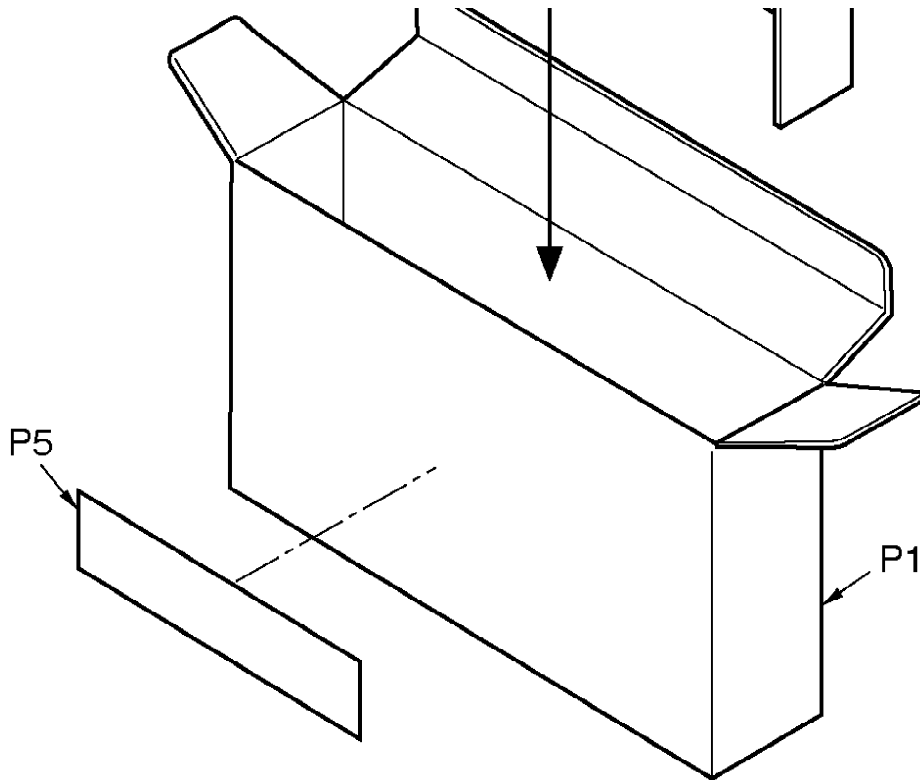


7. CABINET AND ELECTRICAL PARTS LOCATION



8. ACCESSORIES AND PACKING MATERIALS





9. REPLACEMENT PARTS LIST

Model KX-TD188X

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.

2. Important safety notice / Components identified by the mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors

are in MICRO FARADS (μ F) $P = \mu \mu F /$ *Type & Wattage of Resistor

Type					
ERC:Solid ERD:Carbon PQRD:Carbon		ERX:Metal Film ERG:Metal Oxide ER0:Metal Film		PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor	
Wattege					
10,16:1/8W		14,25:1/4W		12:1/2W	
		1:1W		2:2W	
				3:3W	
*Type & Voltage of Capacitor					
Type					
ECFD: Semi-Conductor ECQS:Styrol PQCUV:Chip ECQMS:Mica		ECCD,ECKD,ECBT,PQCBC: Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ: Electlytic ECQP: Polypropylene			
Voltage					
ECQ Type		ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V		05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V 1V :35V 50,1H:50V 1J :63V 2A :100V	

9.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
<u>1</u>	PQKF10185N1	UPPER CABINET	
<u>2</u>	PQKM10244A1	LOWER CABINET	
<u>3</u>	PQKV10007Z1	COVER	
<u>4</u>	PQHD10011Z	SMALL SCREW, STEEL	
<u>5</u>	PQUS141Z	COIL SPRING	
<u>6</u>	XUC3VW	RETAINING RING	
<u>7</u>	PQHX10426Z	COVER	
<u>8</u>	PSMC1028Z	MAGNETIC SHIELD	
<u>9</u>	PSHG1206Z	INDICATION PLATE-LABEL	
<u>10</u>	PSGT2066Z	NAME PLATE, AL	
<u>11</u>	PQLB5F3	INSULATOR	
<u>12</u>	PQMH10237Z	METAL PARTS	
<u>13</u>	PQHE10035Z	SPACER	
<u>14</u>	PSHG1076Z	SPACER	

9.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
<u>A1</u>	XYN4+C35FN	SCREW WITH WASHER, STEEL	
<u>A2</u>	XZB05X08A03	PROTECTION COVER (for Accessorie)	
<u>P1</u>	PQPK10118Z	GIFT BOX	
<u>P2</u>	PQPD10027Z	CUSHION	
<u>P3</u>	PSPD1140Z	CUSHION	
<u>P4</u>	PQPP10047Z	PROTECTION COVER (for set)	
<u>P5</u>	PSQA2237Z	Model No. LABEL	
<u>P6</u>	PSHG1167Z	SPACER	

9.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1TD188X	MAIN BOARD PARTS ASS'Y (RTL)	
		(IC's)	
IC1	PSVIT16G1230	IC	
IC2	PQVI620890F	IC	
IC3	PQVI68301FCG	IC	
IC4	PSVIMT9074AL	IC	
IC5	PSVIMT90812A	IC	
IC6	PSVIMT8981DP	IC	
IC7	PSVIXC9536RV	IC	
IC16, / IC17	PSWITD188X	IC (ROM)	
IC18	PSVICX581AMD	IC	
IC19	PSVICX581AMD	IC	
IC20	PQVISN7L138M	IC	
IC21	PQVISN7L640M	IC	
IC29	PQVISN7L138M	IC	
IC30	PQVISN7L138M	IC	
IC32	PQVISN7L04S	IC	
IC33	PQVISN7L04S	IC	
IC34	PQVISN7L04S	IC	
IC35	PQVISN7L04S	IC	
IC36	PQVISN7L125S	IC	
IC37	PQVISN7L125S	IC	
IC38	PQVISN7L125S	IC	
IC39	PQVISN7H32S	IC	
IC40	PQVISN7H32S	IC	
IC41	PQVISN7L86S	IC	
IC42	PQVISN7L125S	IC	
IC43	PSVIMC33063D	IC	
		(DIODES)	
D1	PSVDRB161LT	DIODE(SI)	
D3	PQVDNSQ03A04	DIODE(SI)	
D4	PSVDRB161LT	DIODE(SI)	
		(CAPACITORS)	
C1	ECEA1EU331	330	
C2	ECUV1E104ZFV	0.1	
C3	ECUV1E104ZFV	0.1	
C4	ECUV1E104ZFV	0.1	
C5	ECUV1E104ZFV	0.1	
C6	ECUV1E104ZFV	0.1	
C7	ECUV1E104ZFV	0.1	
C8	ECUV1E104ZFV	0.1	
C9	ECUV1E104ZFV	0.1	
C10	ECUV1H101JCV	100P	
C11	ECEA1AU331	330	
C12	ECEA1HU330	33	
C13	ECUV1C105KB	1	
C14	ECUV1C105KB	1	
C15	ECUV1C105KB	1	
C16	ECUV1E684KD	0.68	
C17	ECUV1E104ZFV	0.1	
C18	ECUV1E104ZFV	0.1	
C19	ECUV1E104ZFV	0.1	
C20	ECUV1E104ZFV	0.1	
C37	ECUV1E104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C39	ECUV1E104ZFV	0.1	
C42	ECUV1E104ZFV	0.1	
C43	ECUV1E104ZFV	0.1	
C45	ECA1AHG102B	0.001	
C47	ECUV1E104ZFV	0.1	
C48	ECUV1E104ZFV	0.1	
C50	ECUV1E104ZFV	0.1	
C53	ECUV1E104ZFV	0.1	
C54	ECUV1H390JCV	39P	
C55	ECUV1H560JCV	56P	
C56	ECUV1E104ZFV	0.1	
C57	ECUV1E104ZFV	0.1	
C58	ECUV1E104ZFV	0.1	
C59	ECUV1E104ZFV	0.1	
C60	ECUV1H470JCV	47P	
C61	ECUV1H470JCV	47P	
C62	ECUV1E104ZFV	0.1	
C63	ECUV1E104ZFV	0.1	
C64	ECUV1E104ZFV	0.1	
C65	ECUV1E104ZFV	0.1	
C66	ECUV1H102KBV	0.001	
C81	ECUV1E104ZFV	0.1	
C82	ECUV1E104ZFV	0.1	
C84	ECUV1E104ZFV	0.1	
C85	ECUV1E104ZFV	0.1	
C86	ECUV1E104ZFV	0.1	
C87	ECUV1E104ZFV	0.1	
C89	ECUV1E104ZFV	0.1	
C90	ECUV1E104ZFV	0.1	
C91	ECUV1E104ZFV	0.1	
C92	ECUV1E104ZFV	0.1	
C93	ECUV1E104ZFV	0.1	
C94	ECUV1E104ZFV	0.1	
C95	ECUV1E104ZFV	0.1	
C96	ECUV1E104ZFV	0.1	
C97	ECUV1E104ZFV	0.1	
C98	ECUV1E104ZFV	0.1	
C100	ECUV1E104ZFV	0.1	
C101	ECUV1H820JCV	82P	
C102	ECUV1E104ZFV	0.1	
C103	EECFE5R5474	470	
C104	ECEA1AU331	330	
C105	ECUV1C105KB	1	
C106	ECUV1C105KB	1	
C107	ECUV1C105KB	1	
C108	ECUV1E104ZFV	0.1	
C109	ECUV1E104ZFV	0.1	
C111	ECUV1E104ZFV	0.1	
C112	ECUV1E104ZFV	0.1	
C113	ECUV1E104ZFV	0.1	
C114	ECUV1E104ZFV	0.1	
C115	ECUV1E104ZFV	0.1	
C116	ECUV1E104ZFV	0.1	
C117	ECUV1E104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C118	ECUV1E104ZFV	0.1	
		(CONNECTORS)	
CN1	PQJS60R96Y	CONNECTOR	
CN101	PQJS20X33Y	CONNECTOR	
CN102	PQJS20X33Y	CONNECTOR	
CN7	PQJJ1J001Z	JACK/SOCKET	
CN8	PQJJ1J001Z	JACK/SOCKET	
		(CERAMIC FILTER)	
FLT1	PQVFTU50MT	CERAMIC FILTER	
JS1	PSJS32A08Z	CONNECTOR	
JS2	PSJS32A08Z	CONNECTOR	
L6	PQLQR1RM601	COIL	
L7	PQLQR1RM601	COIL	
L8	PQLQR1RM601	COIL	
L9	PQLQR1RM601	COIL	
L10	PQLQR1RM601	COIL	
L11	PQLQR1RM601	COIL	
L12	PQLQR1RM601	COIL	
L13	PQLQR1RM601	COIL	
L14	PQLQR1RM601	COIL	
L15	PQLQR1RM601	COIL	
L16	PQLQR1RM601	COIL	
L17	PQLQR1RM601	COIL	
L18	PQLQR1RM601	COIL	
L19	PQLQR1RM601	COIL	
L20	PQLQR1RM601	COIL	
L21	PQLQR1RM601	COIL	
L22	PQLQR1RM601	COIL	
L23	PQLQR1RM601	COIL	
L24	PQLQR1RM601	COIL	
L25	PQLQR1RM601	COIL	
L26	PQLQR1RM601	COIL	
L27	PQLQR1RM601	COIL	
L28	PQLQR1RM601	COIL	
L29	PQLQR1RM601	COIL	
L30	PQLQR1RM601	COIL	
L31	PQLQR1RM601	COIL	
L32	PQLQR1RM601	COIL	
L33	PQLQR1RM601	COIL	
L34	PQLQR1RM601	COIL	
L35	PQLQR1RM601	COIL	
L36	PQLQR1RM601	COIL	
L37	PQLQR1RM601	COIL	
L38	PQLQR1RM601	COIL	
L39	PQLQR1RM601	COIL	
L40	PQLQR1RM601	COIL	
L41	PQLQR1RM601	COIL	
L42	PQLQR1RM601	COIL	
L43	PQLQR1RM601	COIL	
L5	PQLQR1RM601	COIL	
L52	PSLQR1Z101M	COIL	
L54	PSLE1039	COIL	
L55	PSLE1039	COIL	
LED1	LN28RPXTA3	DIODE(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
LED2	LN28RPXTA3	DIODE(SI)	
LED3	LN28RPXTA3	DIODE(SI)	
LED4	LN28RPXTA3	DIODE(SI)	
LED5	LN28RPXTA3	DIODE(SI)	
Q1	2SB1237R	TRANSISTOR(SI)	
Q2	PQVTDTC143E	TRANSISTOR(SI)	
Q3	2SB1070P	TRANSISTOR(SI)	
R1	PQRD1VJ220	22	
R2	ERJ3GEYJ561	560	
R4	ERJ3GEY0R00	0	
R5	ERJ3GEYJ330	33	
R6	ERJ3GEYJ330	33	
R7	ERJ3GEYJ330	33	
R8	ERJ3GEYJ330	33	
R9	ERJ3GEYJ330	33	
R10	ERJ3GEYJ330	33	
R11	ERJ3GEYJ330	33	
R12	ERJ3GEYJ330	33	
R13	ERJ3GEYJ103	10K	
R14	ERJ3GEYJ103	10K	
R15	ERJ3GEYJ103	10K	
R16	ERJ3GEYJ103	10K	
R167	ERJ3GEY0R00	0	
R169	ERJ3GEYJ103	10K	
R17	ERJ3GEYJ103	10K	
R172	ERJ3GEYJ103	10K	
R178	ERJ3GEYJ103	10K	
R179	ERJ3GEYJ103	10K	
R18	ERJ3GEYJ103	10K	
R188	ERJ3GEYJ330	33	
R189	ERJ3GEY0R00	0	
R19	ERJ3GEYJ103	10K	
R196	ERJ3GEYJ103	10K	
R197	ERJ3GEYJ103	10K	
R198	ERJ3GEYJ103	10K	
R20	ERJ3GEYJ103	10K	
R203	ERJ3GEYJ103	10K	
R204	ERJ3GEYJ330	33	
R207	ERJ3GEYJ330	33	
R21	ERJ3GEYJ103	10K	
R22	ERJ3GEYJ103	10K	
R23	ERJ3GEYJ103	10K	
R231	ERJ3GEY0R00	0	
R24	ERJ3GEYJ103	10K	
R25	ERJ3GEYJ103	10K	
R26	ERJ3GEYJ103	10K	
R27	ERJ3GEYJ103	10K	
R28	ERJ3GEYJ103	10K	
R29	ERJ3GEYJ103	10K	
R30	ERJ3GEYJ103	10K	
R31	ERJ3GEYJ103	10K	
R32	ERJ3GEYJ103	10K	
R33	ERJ3GEYJ103	10K	
R34	ERJ3GEYJ103	10K	

Ref. No.	Part No.	Part Name & Description	Remarks
R35	ERJ3GEYJ103	10K	
R36	ERJ3GEYJ103	10K	
R37	ERJ3GEYJ103	10K	
R38	ERJ3GEYJ103	10K	
R39	ERJ3GEYJ103	10K	
R40	ERJ3GEYJ103	10K	
R41	ERJ3GEYJ103	10K	
R42	ERJ3GEYJ103	10K	
R43	ERJ3GEYJ103	10K	
R44	ERJ3GEYJ103	10K	
R45	ERJ3GEYJ103	10K	
R46	ERJ3GEYJ103	10K	
R47	ERJ3GEYJ103	10K	
R48	ERJ3GEYJ103	10K	
R49	ERJ3GEYJ103	10K	
R50	ERJ3GEYJ103	10K	
R51	ERJ3GEYJ103	10K	
R52	ERJ3GEYJ103	10K	
R53	ERJ3GEYJ103	10K	
R54	ERJ3GEYJ103	10K	
R55	ERJ3GEYJ103	10K	
R56	ERJ3GEYJ103	10K	
R57	PQ4R10XJ4R7	4.7	
R58	PQ4R10XJ4R7	4.7	
R59	ERJ6GEYJ750	75	
R60	ERJ3GEYJ103	10K	
R61	ERJ3GEYJ103	10K	
R62	ERJ3GEYJ103	10K	
R63	ERJ3GEYJ103	10K	
R65	ERJ3GEYJ103	10K	
R66	ERJ3GEYJ103	10K	
R69	ERJ3GEYJ101	100	
R70	ERJ3GEYJ105	1M	
R73	ERJ3GEYJ103	10K	
R74	ERJ3GEYJ103	10K	
R75	ERJ3GEYJ103	10K	
R76	ERJ3GEYJ103	10K	
R77	ERJ3GEYJ103	10K	
R78	ERJ3GEYJ103	10K	
R79	ERJ3GEYJ470	47	
R80	ERJ3GEYJ102	1K	
R81	ERJ3GEYJ102	1K	
R82	ERJ3GEYJ102	1K	
R83	ERJ3GEYJ102	1K	
R84	ERJ3GEYJ105	1M	
R85	ERJ3GEYJ103	10K	
R86	ERJ3GEYJ103	10K	
R87	ERJ3GEYJ103	10K	
R88	ERJ3GEYJ103	10K	
R89	ERJ3GEYJ103	10K	
R90	ERJ3GEYJ103	10K	
R91	ERJ3GEYJ103	10K	
R92	ERJ3GEYJ103	10K	
R93	ERJ3GEYJ103	10K	

Ref. No.	Part No.	Part Name & Description	Remarks
R94	ERJ3GEYJ103	10K	
R95	ERJ3GEYJ103	10K	
R96	ERJ3GEYJ102	1K	
R97	ERJ3GEYJ103	10K	
R98	ERJ3GEYJ103	10K	
R99	ERJ3GEYJ103	10K	
R100	ERJ3GEYJ103	10K	
R101	ERJ3GEYJ103	10K	
R168	ERJ3GEY0R00	0	
R171	ERJ3GEYJ103	10K	
R185	ERJ3GEYJ822	8.2K	
R190	ERJ3GEYJ103	10K	
R191	ERJ3GEYJ272	2.7K	
R192	ERJ3GEY0R00	0	
R195	ERJ3GEYJ331	330	
R199	ERJ3GEY0R00	0	
R201	ERJ3GEYJ103	10K	
R202	ERJ3GEYJ103	10K	
R205	ERJ3GEYJ330	33	
R206	ERJ3GEYJ330	33	
R208	ERJ3GEYJ120	12	
R209	ERJ3GEYJ120	12	
R210	ERJ3GEYJ330	33	
R211	ERJ3GEYJ103	10K	
R213	ERJ3GEY0R00	0	
R214	ERJ3GEYJ330	33	
R215	ERJ3GEYJ330	33	
R216	ERJ3GEYJ330	33	
R217	ERJ3GEYJ330	33	
R220	ERJ3GEYJ330	33	
R221	ERJ3GEYJ330	33	
R222	ERJ3GEYJ330	33	
R223	ERJ3GEYJ330	33	
R224	ERJ3GEYJ330	33	
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R226	ERJ3GEYJ330	33	
R227	ERJ3GEYJ330	33	
R228	ERJ3GEYJ330	33	
R229	ERJ3GEYJ330	33	
R230	ERJ3GEYJ330	33	
R233	ERJ3GEYJ560	56	
R234	ERJ3GEYJ560	56	
R235	ERJ3GEYJ101	100	
R236	ERJ3GEYJ101	100	
R237	ERJ3GEYJ101	100	
J 7	ERJ3GEY0R00	0	
J 8	ERJ3GEY0R00	0	
J 9	ERJ3GEY0R00	0	
J10	ERJ3GEY0R00	0	
J11	ERJ3GEY0R00	0	
J12	ERJ3GEY0R00	0	
J13	ERJ3GEY0R00	0	
J22	ERJ6GEY0R00	0	
L 1	ERJ6GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
L 2	ERJ6GEY0R00	0	
L 3	ERJ6GEY0R00	0	
L 4	ERJ6GEY0R00	0	
L44	ERJ6GEY0R00	0	
L45	ERJ6GEY0R00	0	
L46	ERJ6GEY0R00	0	
L51	ERJ6GEY0R00	0	
SA1	PSVDT83A230X	VARISTOR	
SA5	PSVDT83A230X	VARISTOR	
SA6	PQVDDSV301L	VARISTOR	
T1	PSLT9Z17A	TRANSFORMER	
T2	PSLT9Z16A	TRANSFORMER	
TH1	PSRPR600160B	THERMISTOR	
TH2	PSRPR600160B	THERMISTOR	
TH3	PSRPR600160B	THERMISTOR	
TH4	PSRPR600160B	THERMISTOR	
X1	PSVCC0036DT	CRYSTAL OSCILLATOR	
X2	PSVCCR0819D2	CRYSTAL OSCILLATOR	

9.4. SUB BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2TD188X	SUB BOARD PARTS ASS'Y (RTL)	
		(IC)	
IC301	PSVI320V542P	IC	
IC302	PSVISNVC4245	IC	
IC303	PSVISNLV541A	IC	
IC304	PSVISNLV541A	IC	
IC306	PSVITPS73318	IC	
IC307	PQVISN7H08S	IC	
IC308	PQVITC7H04AF	IC	
IC309	PQVISN7H74S	IC	
IC310	PQVISN7H74S	IC	
		(DIODE)	
D301	PSVDUDZ20B	DIODE(SI)	
		(CONNECTOR)	
CN301	PQJP20D30Y	CONNECTOR	
CN302	PQJP20D30Y	CONNECTOR	
		(CAPACITER)	
C301	ECUV1E104ZFV	0.1	
C302	ECUV1E104ZFV	0.1	
C303	ECUV1E104ZFV	0.1	
C304	ECUV1E104ZFV	0.1	
C306	ECUV1E104ZFV	0.1	
C307	ECUV1E104ZFV	0.1	
C308	ECUV1H102KBV	0.001	
C309	ECUV1H180JCV	18P	
C310	ECUV1H180JCV	18P	
C311	PQCUV1H105JC	1	
C312	PQCUV1H105JC	1	
C313	ECEV1AA330S	33	
C314	ECEV1AA330S	33	
C315	ECUV1E104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C316	ECUV1E104ZFV	0.1	
C317	ECUV1E104ZFV	0.1	
C318	ECUV1E104ZFV	0.1	
	(RESISTORS)		
J301	ERJ3GEY0R00	0	
J304	ERJ3GEY0R00	0	
J305	ERJ3GEY0R00	0	
J307	ERJ3GEY0R00	0	
R301	ERJ3GEYJ330	33	
R302	ERJ3GEYJ330	33	
R303	ERJ3GEYJ330	33	
R304	ERJ3GEYJ330	33	
R305	ERJ3GEYJ330	33	
R306	ERJ3GEYJ330	33	
R307	ERJ3GEYJ330	33	
R308	ERJ3GEYJ330	33	
R309	ERJ3GEYJ330	33	
R310	ERJ3GEYJ330	33	
R311	ERJ3GEYJ330	33	
R312	ERJ3GEYJ330	33	
R313	ERJ3GEYJ330	33	
R314	ERJ3GEYJ330	33	
R315	ERJ3GEYJ330	33	
R316	ERJ3GEYJ330	33	
R317	ERJ3GEYJ330	33	
R318	ERJ3GEYJ330	33	
R319	ERJ3GEYJ330	33	
R320	ERJ3GEYJ330	33	
R321	ERJ3GEYJ330	33	
R322	ERJ3GEYJ330	33	
R323	ERJ3GEYJ330	33	
R324	ERJ3GEYJ330	33	
R325	ERJ3GEYJ330	33	
R326	ERJ3GEYJ330	33	
R327	ERJ3GEYJ330	33	
R328	ERJ3GEYJ330	33	
R329	ERJ3GEYJ330	33	
R330	ERJ3GEY0R00	0	
R331	ERJ3GEY0R00	0	
R333	ERJ3GEYJ472	4.7K	
R334	ERJ3GEYJ472	4.7K	
R335	ERJ3GEYJ103	10K	
R336	ERJ3GEYJ330	33	
		(CRYSTAL OSCILLATOR)	
X301	PSVCCR2000D4	CRYSTAL OSCILLATOR	

10. BLOCK DIAGRAM

11. SCHEMATIC DIAGRAM (MAIN)

11.1. NO.1

11.2. NO.2

11.3. NO.3

11.4. NO.4

12. SCHEMATIC DIAGRAM (SUB)

13. VOLTAGE WAVE

13.1. NO.1

13.2. NO.2

13.3. NO.3

14. TIMING CHART

15. CIRCUIT DIAGRAM (MAIN)

15.1. COMPONENT VIEW

15.2. BOTTOM VIEW

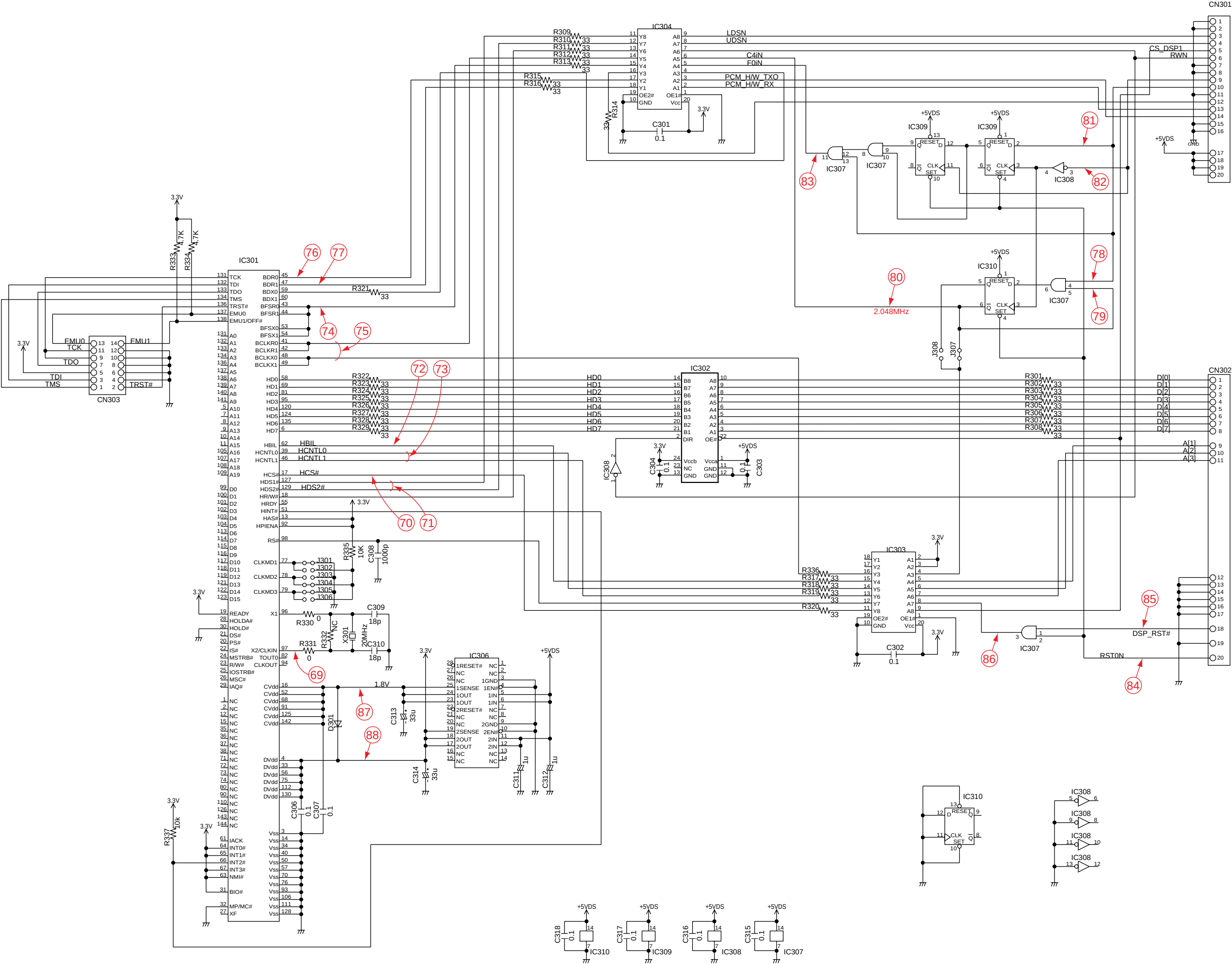
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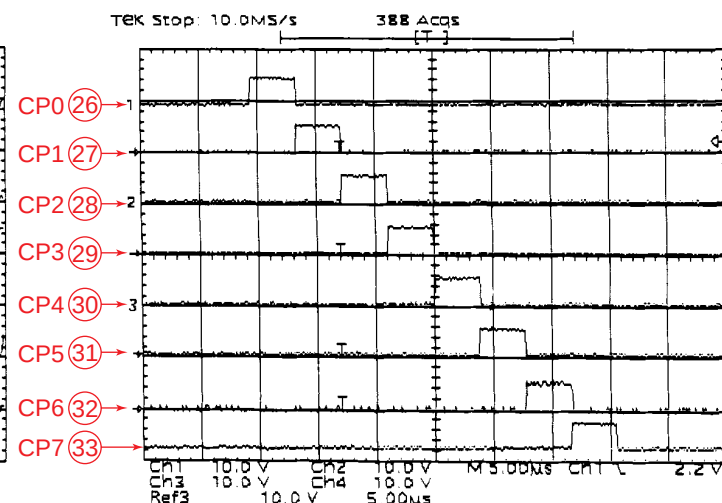
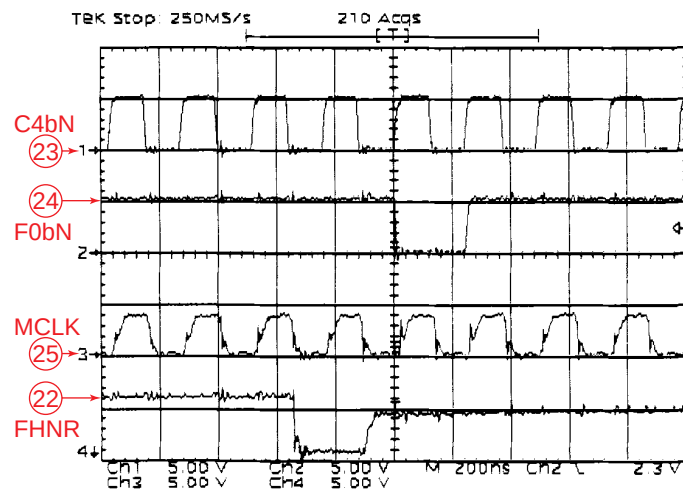
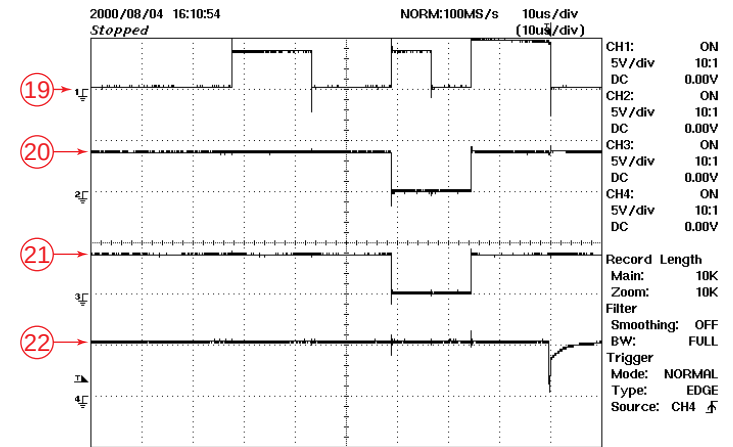
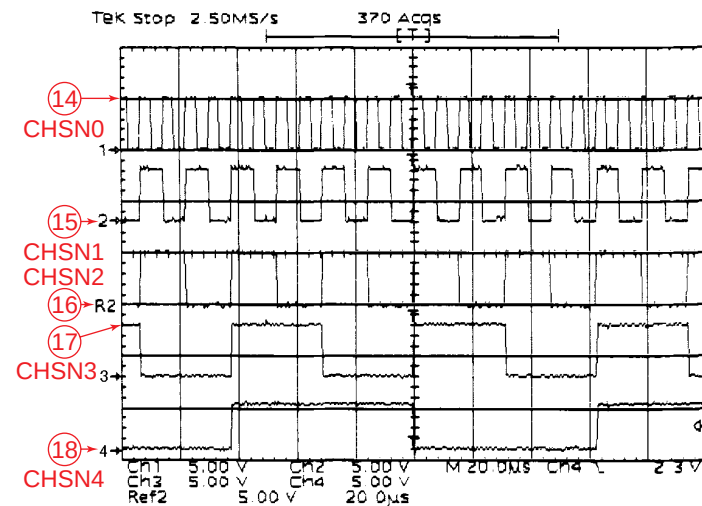
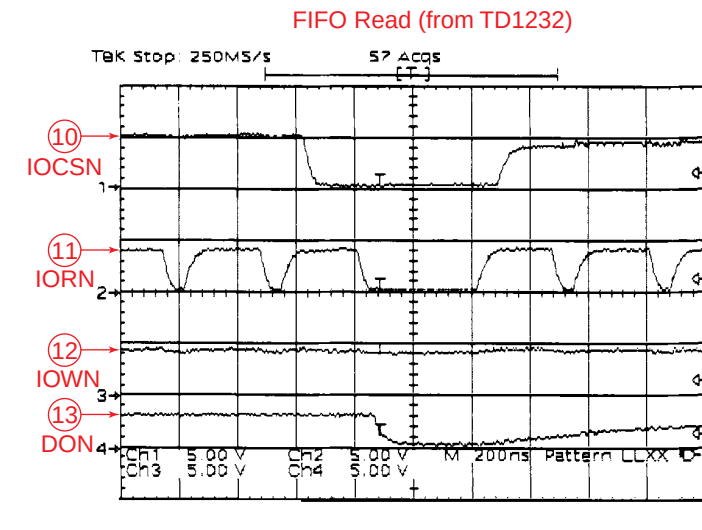
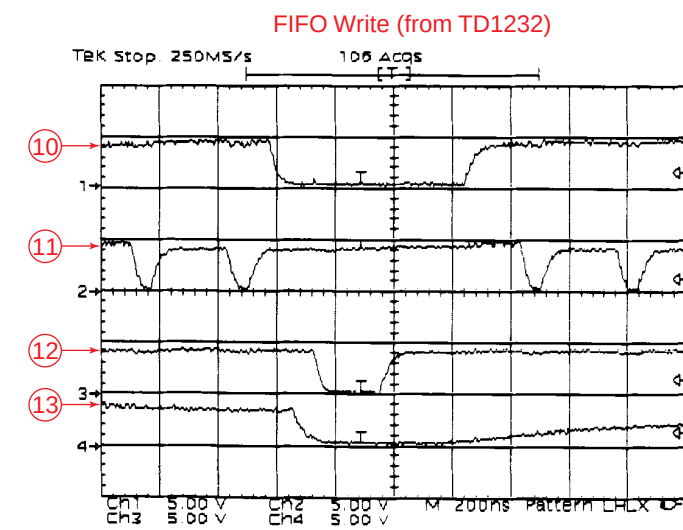
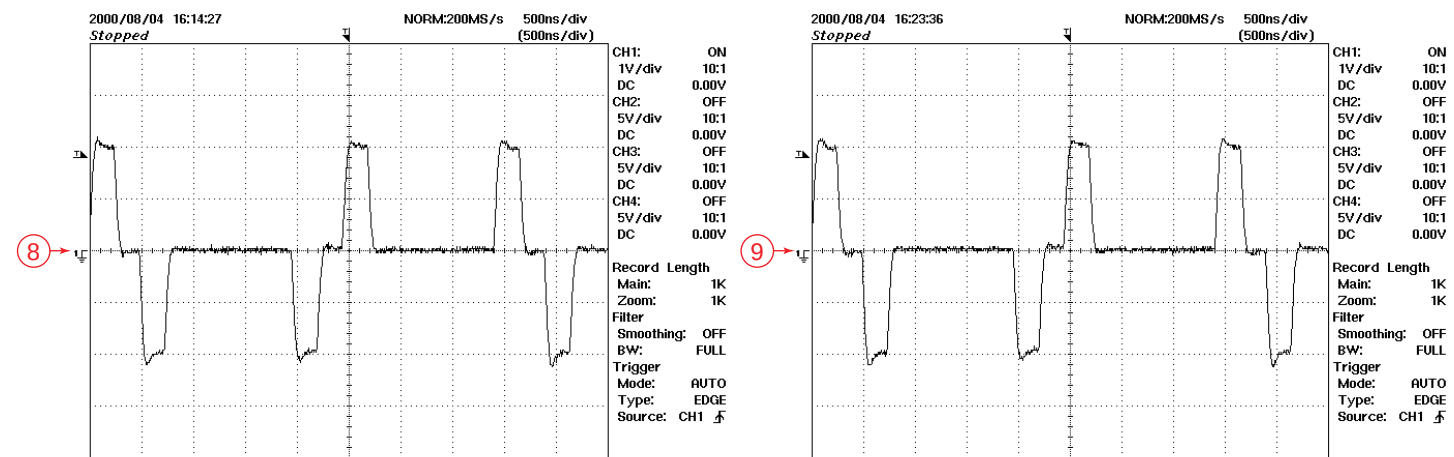
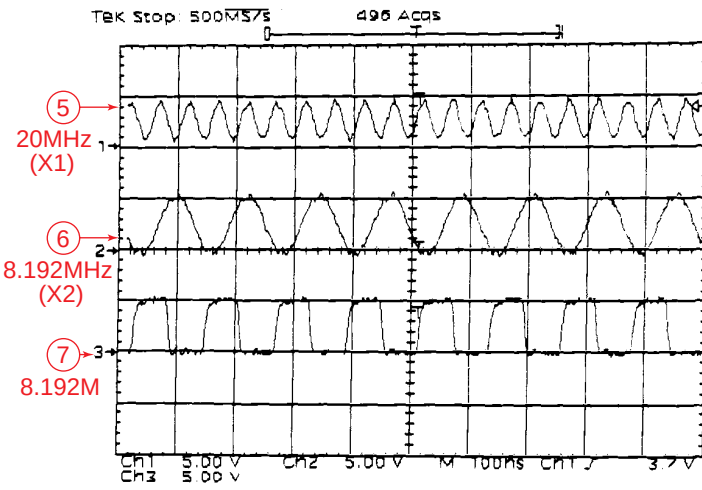
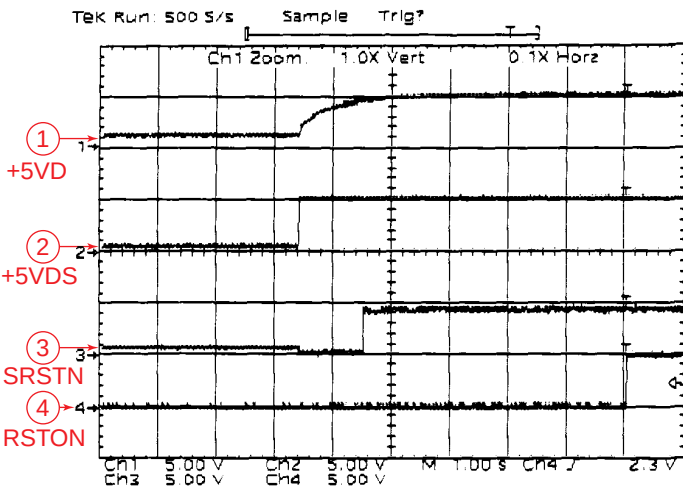
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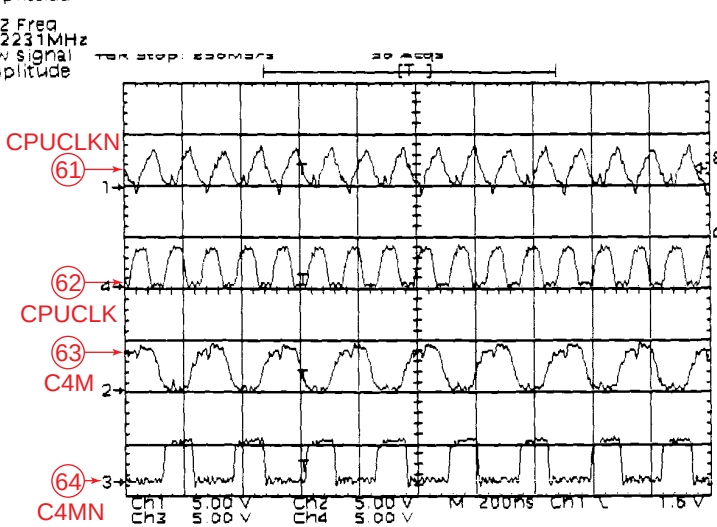
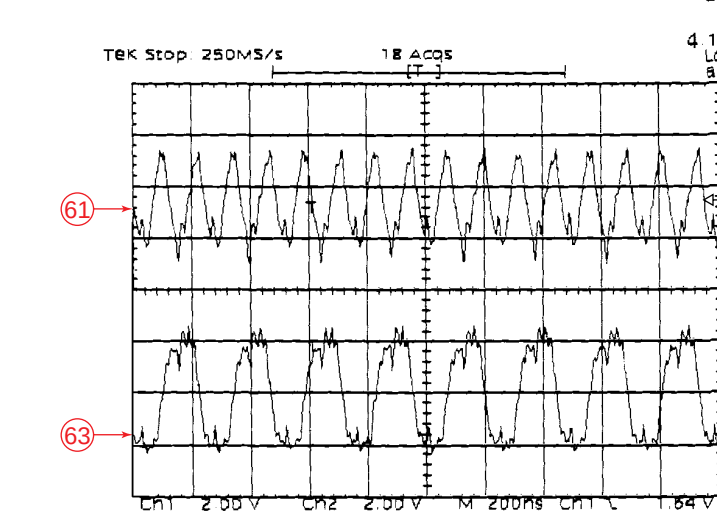
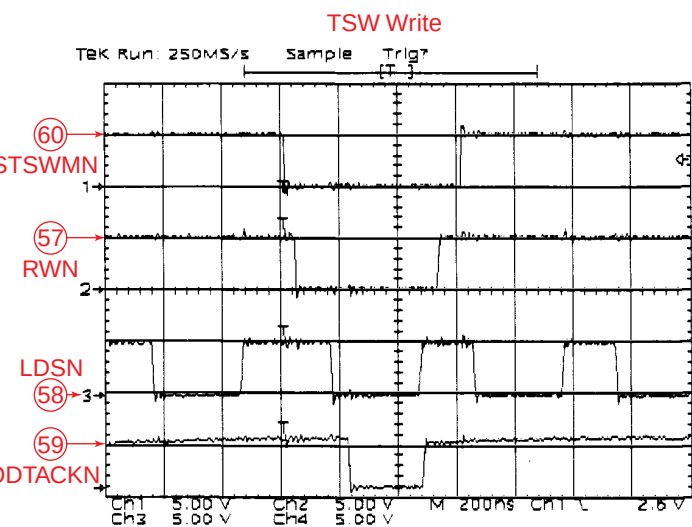
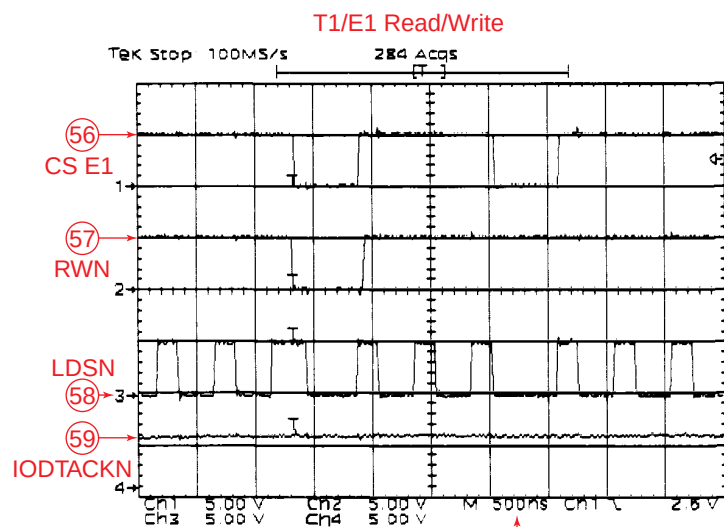
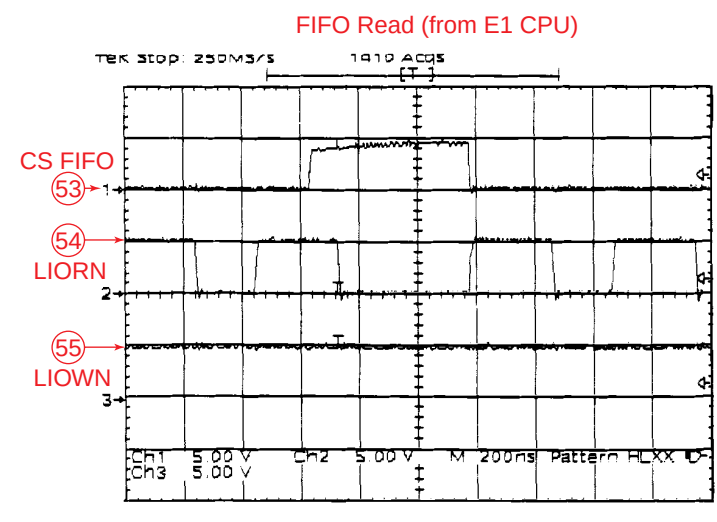
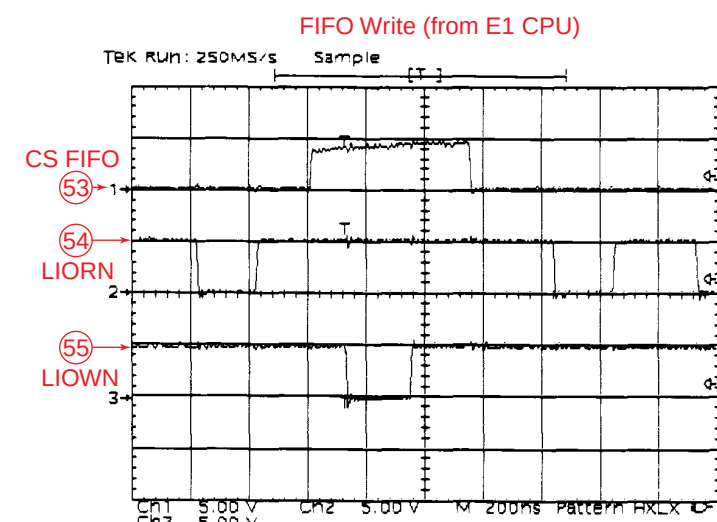
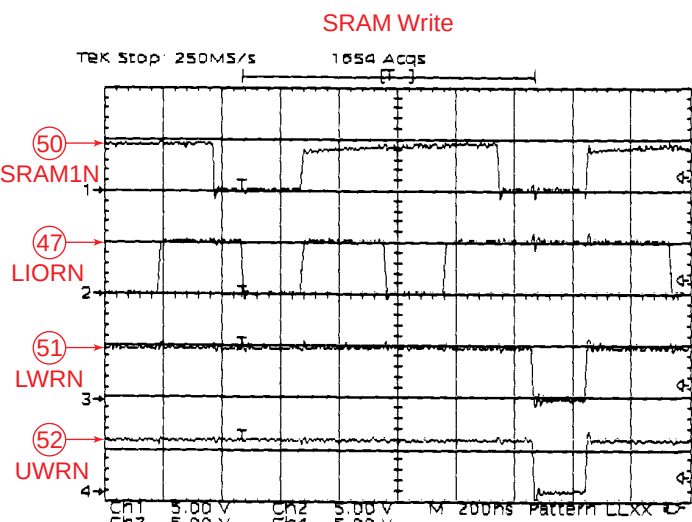
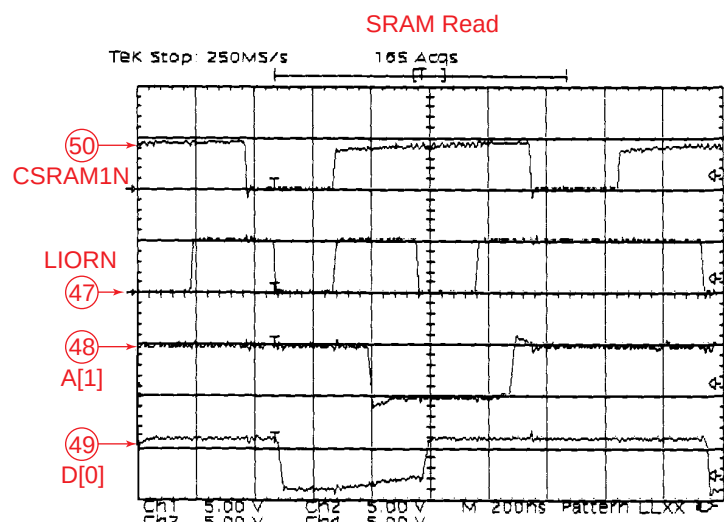
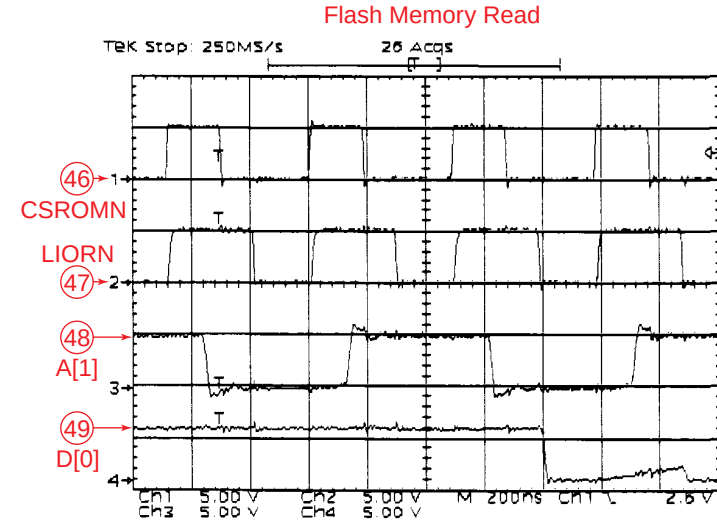
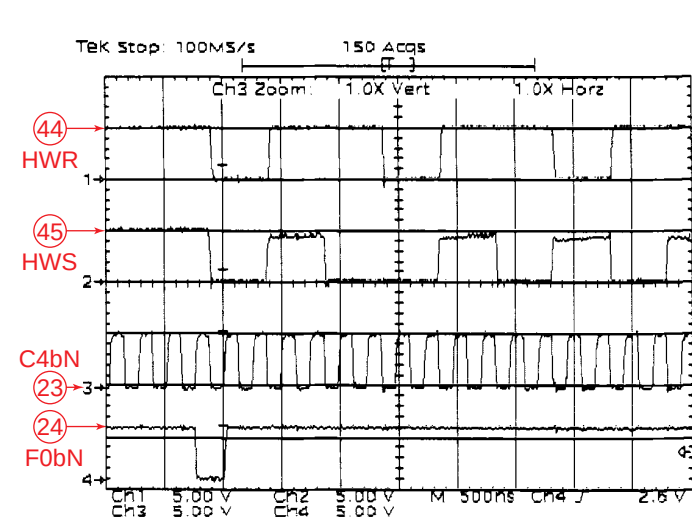
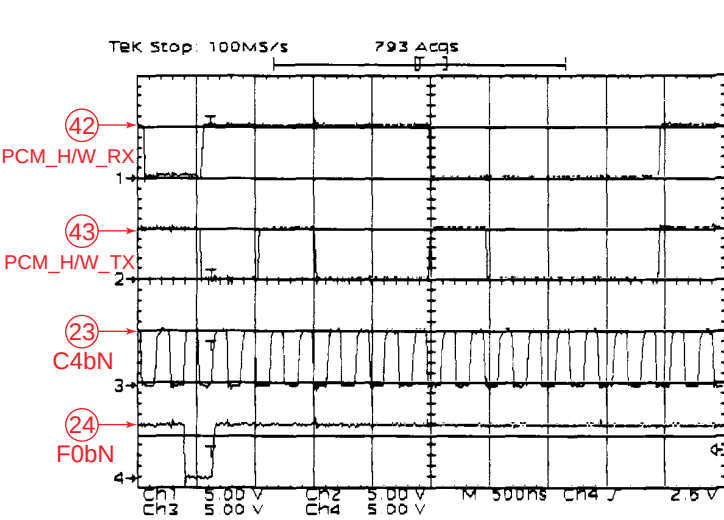
16. CIRCUIT DIAGRAM (SUB)

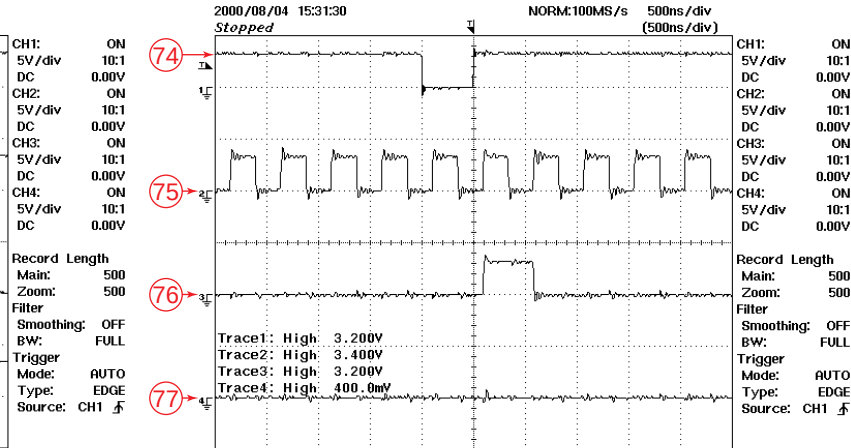
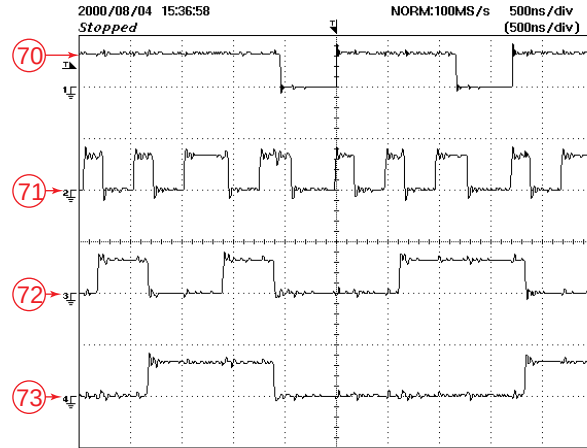
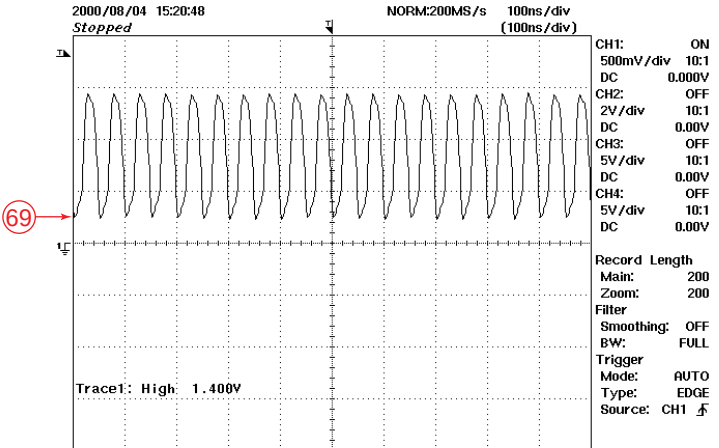
16.1. COMPONENT VIEW

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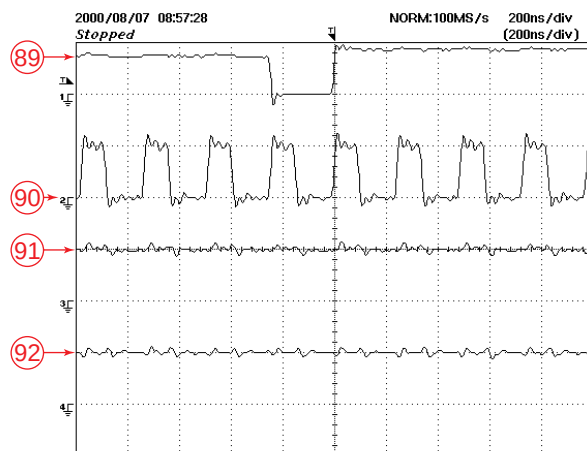
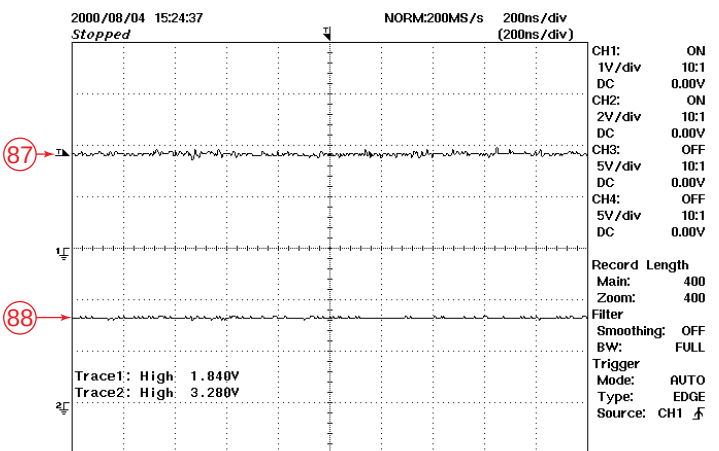
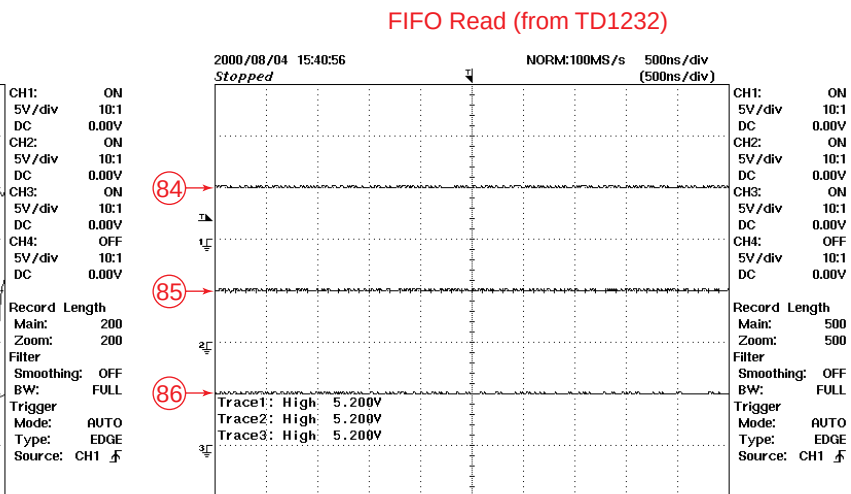
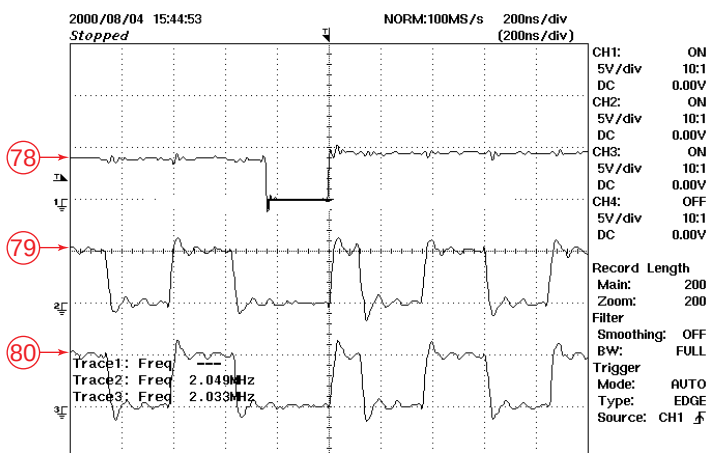


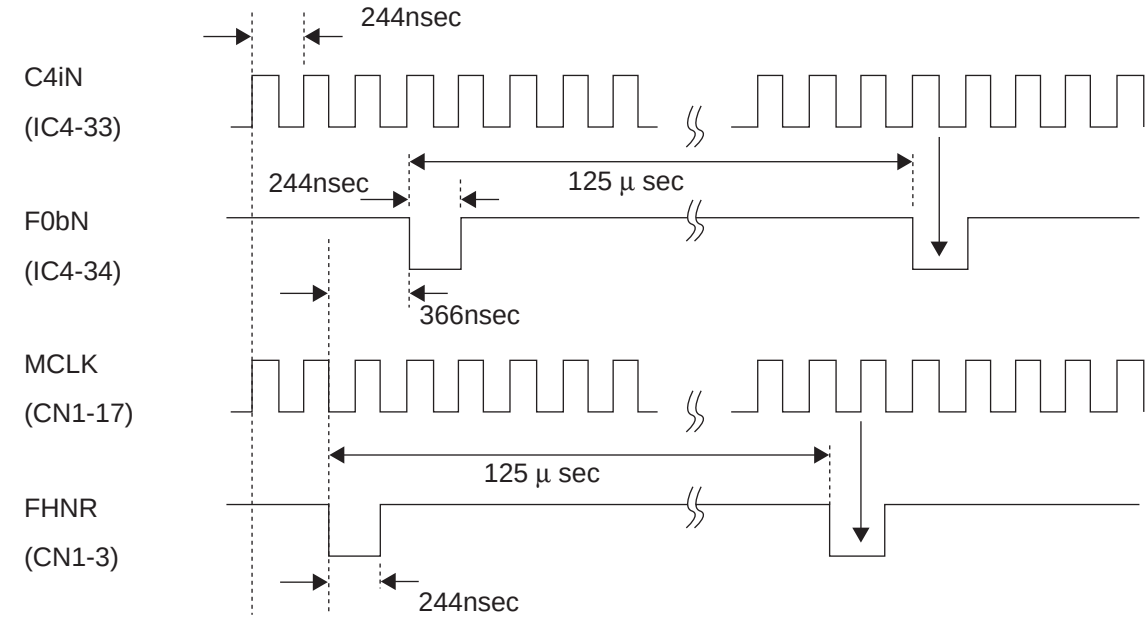
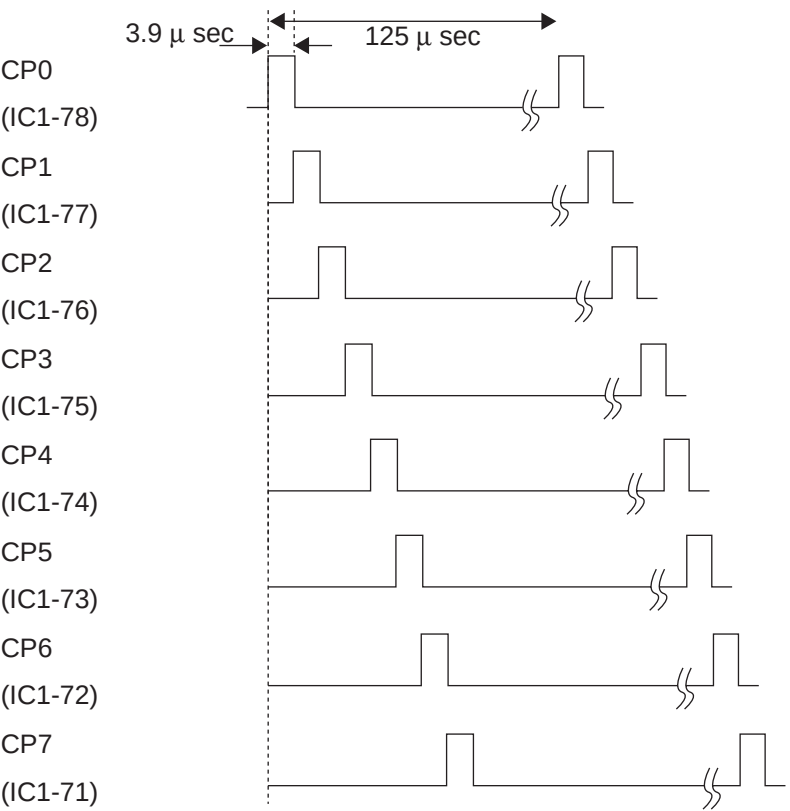
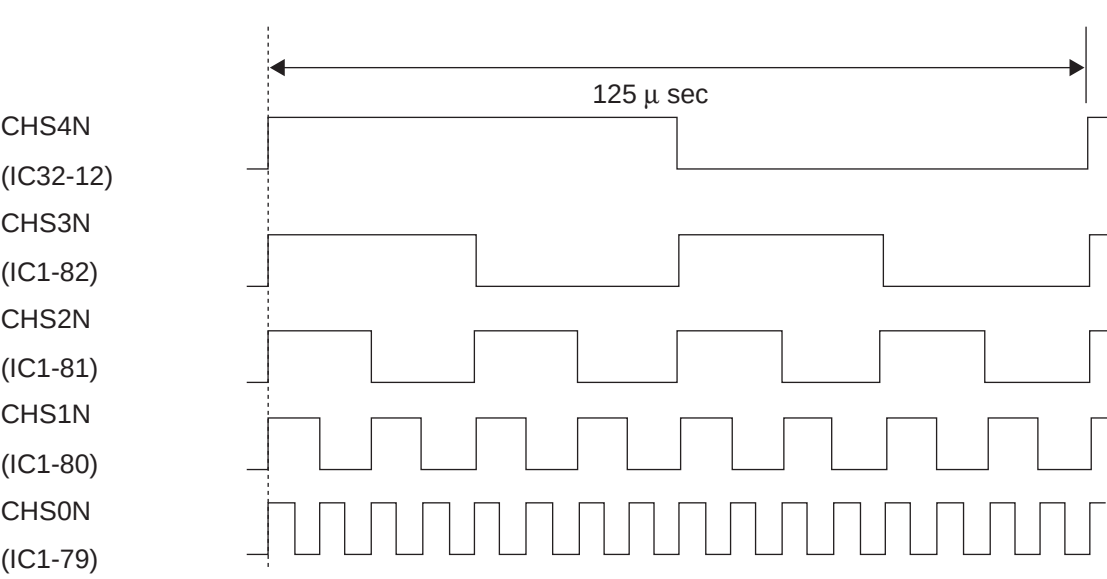


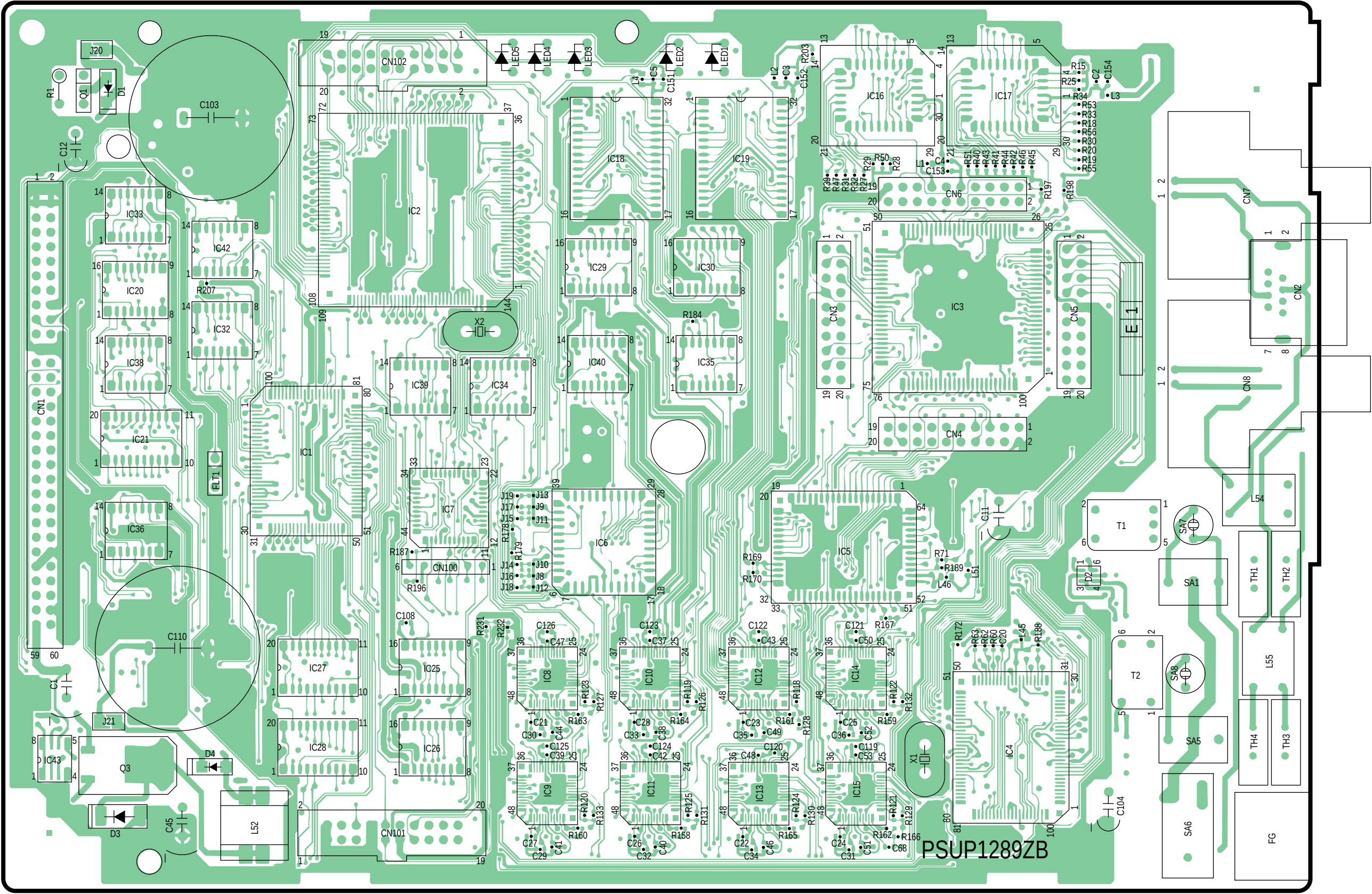


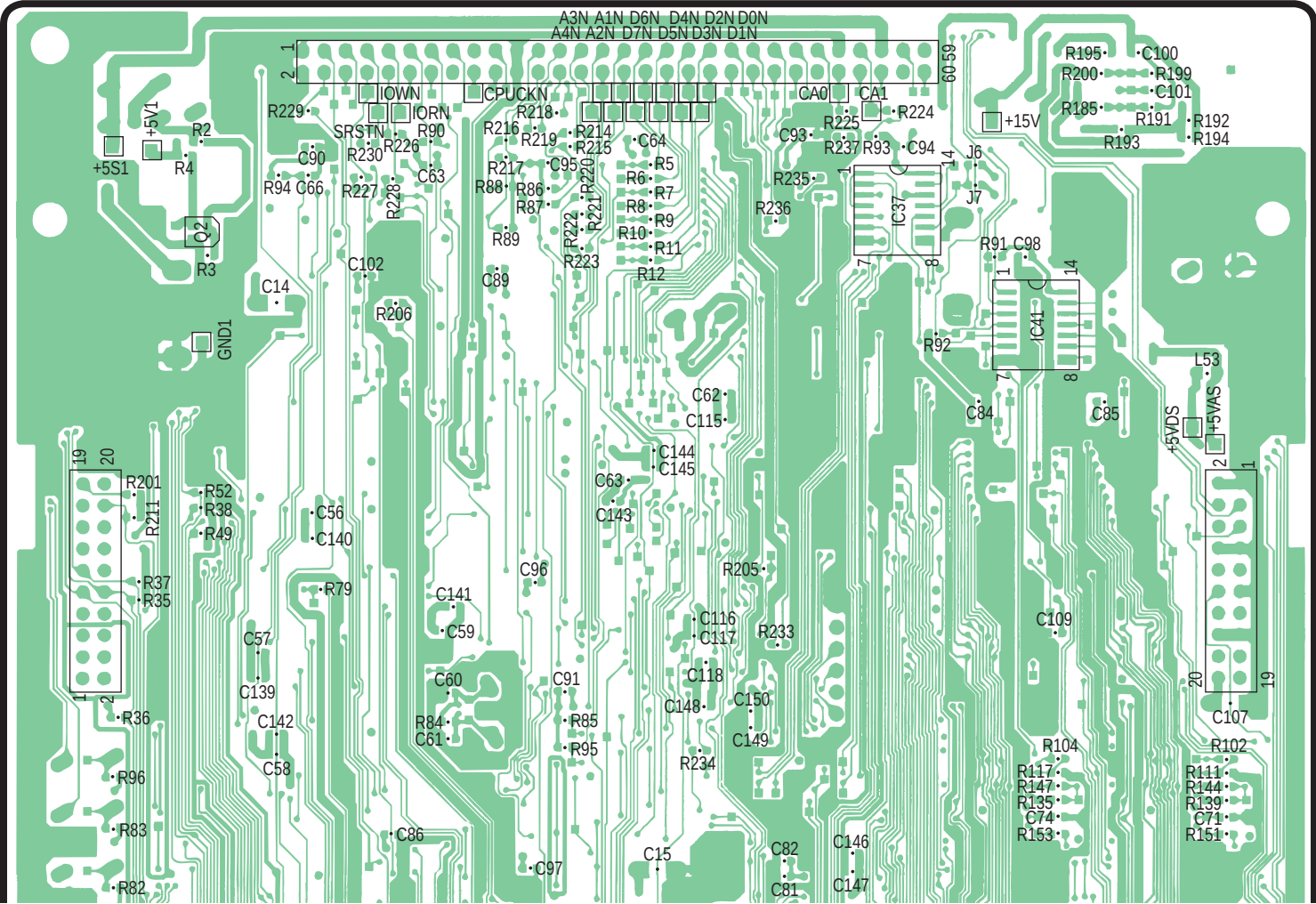


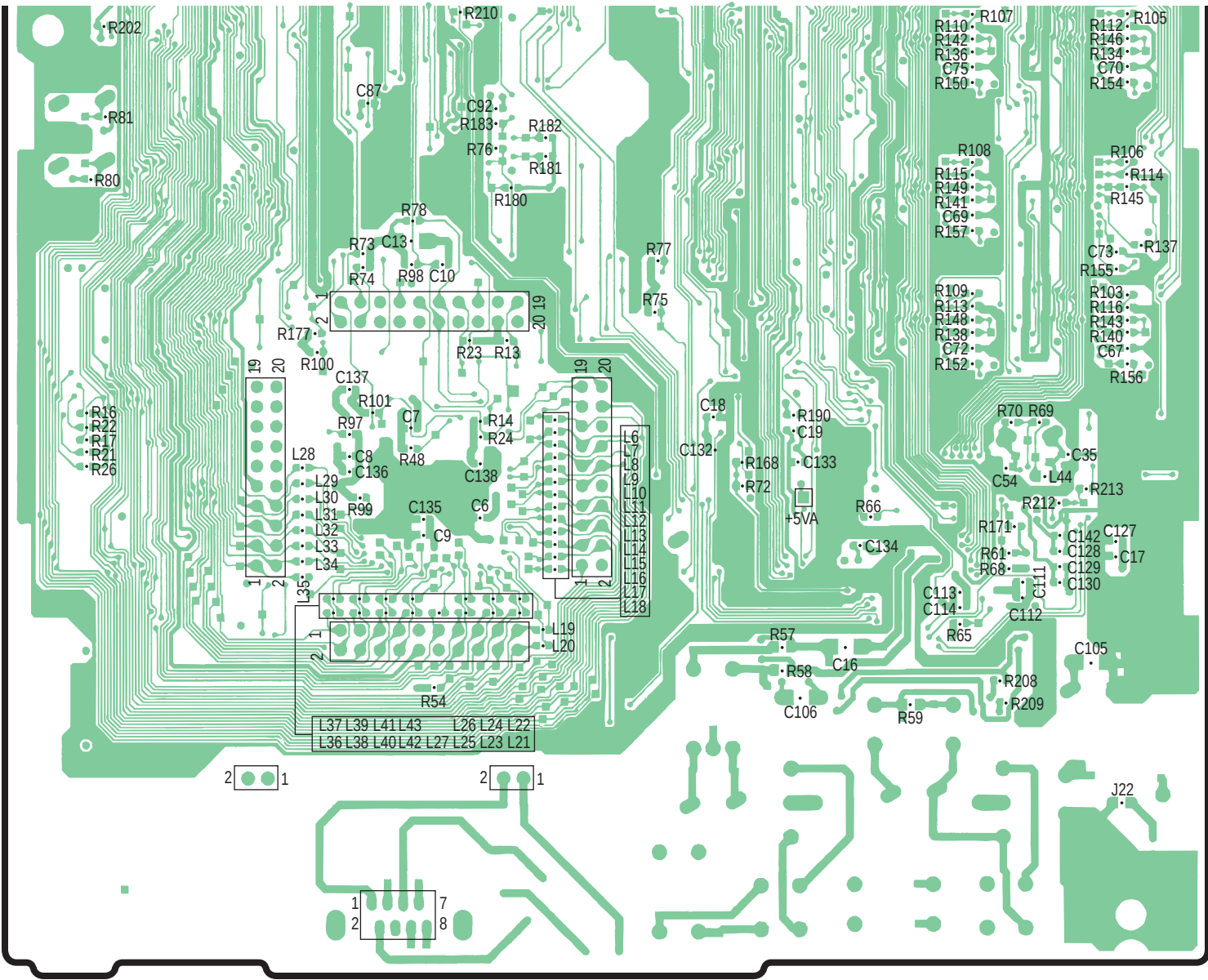
FIFO Write (from TD1232)











PSUP1290Z

